THE FARMERS' REGISTER.

VOL. VII. MARCH 31, 1839. No. 3.

EDMUND RUFFIN, EDITOR AND PROPRIETOR.

ON THE BREEDING OF LIVE-STOCK,

AND ON THE COMPARATIVE INFLUENCE OF THE MALE AND FEMALE PARENTS IN IMPRESSING THE OFFSPRING.

(Concluded from page 123.)

I have thus produced facts of the influence of the male on the progeny in the horse, the cow, the sheep, and the sow, and in all I have endeavored to show to the society, that, whether that parent be the high bred one or not—whether to improve or to deteriorate—it is the *male* which has by far the greatest influence over the offspring. I would still quote one fact more, which has come under my own eye; it is in the common fowl. In the year 1810, I procured a breed of the Malay or Chittagong fowls, and those I crossed once or twice with cocks of the same breed, got from different quarters. In spring, 1824, they had been bred from cocks reared at home for three or four years, and were then all dark colored, without a white feather, having either black or yellow legs. Most of them resembled a partridge. At this time I learned there was in a farmer's possession a breed of fine Malays, which his brother (a surgeon on board an Indiaman,) had brought home. I sent and purchased one. He was what cock-fighters termed "pied," or in other words, had numerous white feathers all over his body, with white legs. From this cock were bred, in summer 1824, about seventy-eight chicks, of which number seventy-three were either pied or had a great deal of white on them; and a great proportion of them had white legs. Nothing but the influence of the male parents could have done this, for the hens were all gallant hens, not a white feather was to be found amongst them; nor could it have been owing to their ancestors, for they had all pedigree as long as Sir Watkin Williams Wynne.

Thus far have I stated facts which are known to myself and friends only; I would now mention some which are within the reach of all. Let us call to mind the offspring from the mare and the jackass. Is it not obvious to all the influence the male parent has on the mule? Color, shape of head, ears, and whole body, constitution, even temper, are all derived from the male parent. I had an opportunity of observing the very same effects in the colt from a quagga and a mare, in the possession of the Earl of Morton, at Dalmahoy. And his lordship, I believe, observed that the same mare, afterwards covered by a horse, retained in the progeny a resemblance to the quagga,* a fact of the most extraordinary nature.† I have been frequently told that a mule got by a horse, with the female ass, is a far superior animal, and retains the mane, with the ears much less, &c.; but this is a fact I never could get to the bottom of. I only know it is believed by the Spaniards.‡ Nothing can be more striking than the power of the male in birds. It is well known that bird fanciers, as they are called, put a cock goldfinch to a hen canary, and that way get a strong, beautiful male-bird, having the greater part in plumage, song, and total appearance of the goldfinch, and showing, to the most trivial observer, that the male had the greatest influence in the progeny. Every one knows that the hen of any bird will lay eggs although no male be permitted to come near her; and that those eggs are only wanting in the vital principle which the impregnation of the male conveys to them. Here, then, we see the female able to make an egg, with yolk and white, shell and every part, just as it ought to be, so that we might, at the first glance, suppose that here, at all events, the female has the greatest influence. But see the change which the male produces. Put a bantam cock to a large-sized hen, and she will instantly lay a small egg; the chick will be short in the leg, have feathers to the foot, and put on the appearance of the cock; so that it is a frequent complaint where bantams are kept, that they make the hens lay small eggs and spoil the breed. Reverse the case; put a large dung-hill cock to bantam hens, and instantly they will lay larger eggs, and the chicks will be good sized birds, and the bantam will have nearly disappeared. Here, then, are a number of facts known to every one, or at least open to be known by every one, clearly proving the influence of the male in some animals; and as I hold it to be an axiom that nature never acts by contraries—never outrages the law clearly fixed in one species, by adopting the opposite course in another—therefore, as in the case of an equilateral triangle, on the length of one side being given, we can, with certainty, demonstrate that of the remaining; so, having, found these laws to exist in one race of animals, we are entitled to assume that every species is subjected to the self-same rules—the whole bearing, in fact, the same relation to each other as the radii of a circle.

Now, then, to the point of expediency. Let us suppose that I have formed an erroneous opinion, and that other essayists bring forward counter-proof, to show the power of the female. What difficulties arise in changing the whole females on an extensive farm, while, with what ease a new male is procured! Sir John Sebright says, "Many females throw progeny unlike themselves, and it would be wise to try them with a male whose stock is known previous to breeding from them." How should we manage if we found it necessary from this cause, to put away a set of females, which we had procured from a great distance, for the very purpose of improving our breed? If proof were required in a thing so plain to common sense, the enormous prices given for males in com-

---

* The quagga is the species which links the zebra and the ass.

† An account of the circumstance alluded to by the author is given by the late Lord Morton, in the Phil. Trans. for 1821, p. 21.—(EDIT.)

‡ If a mule be remarked in Spain as particularly neat and handsome, the muleteer will always say, "*Si, signor, caballo estavo, padre.*" Yes, sir, a horse was his father.

parison of females, would show the advantage of getting that sex which can give the breeder a hundred of his offspring in a season in place of one. Another advantage is the letting out the males to hire for the season, a thing greatly to be wished the soceity would encourage, and give premiums for. The system is productive of the best consequences, a few of which it may be well to bring before the society; and be it remembered that it is only by the male, for a thousand obvious reasons, that it can be done. When a person has bred or purchased a male, he not only does not like to put him away, although he perhaps has found out that he is not well calculated, either as to cross or selection, to suit the females he has to put him to; but from the partiality which we all have for our own, it is ten to one but we think an animal, which, in truth, is of no value, to be a very fine one; and thus the breeder patters on with an inferior animal, instead of year by year selecting such a male for hire as he sees would be best suited to correct the faults of his stock. Look to the good arising in our breed of horses from this system, which in fact public stallions exemplify. Look how the districts in England, where the practice of letting bulls and rams of by the season exists, have far outstripped the rest the island in the excellence of the stock which they possess; and let any one say if the benefit resulting from it is not self-evident. If such a thing were to be introduced in Scotland, and I shall hope one day to see it introduced under the patronage of the Highland Society, it ought decidedly to be in the shape of shows or competitions. Then a spirited farmer, or a few neighbors, could join and procure a fine animal at an easy rate: then the ignorant pretending judge would be told the truth by the verdict passed on his property by the public, who would not spare either his veracity or self-conceit; comparison would teach all a better taste and judgment; fine animals would be brought from England, and all parts of the country; and rewards, not only of fame, but of emolument, would be conferred on the man who paid the greatest attention to his trade, and consequently brought foward the finest animals. I do not think I can better conclude than by quoting the words of Sir John Sebright, whose ideas on the subject altogether coincide with my own. "There is, perhaps," says he, "no means by which the breed of animals can be so rapidly and so effectually improved, as by its being the particular business of some breeders to provide MALE *animals* for the purpose of letting to hire. No trouble or expense will be spared by those who expect to derive profit, not from the quantity but from the quality of the animals which they breed; the competition which must always exist between breeders of this description will be a never-failing stimulus to exertion. The common farmer, who seldom sees any stock but his own or that of his neighbors, generally concludes that his have arrived at the summit of perfection. But the breeder, who lets for hire, must frequently submit his own male animals to the inspection of the public, and to the criticism of his rivals, who will certainly not encourage any prejudices he may entertain of their superiority. Thus each, besides the improvement of his stock, will receive a fair remuneration; and every breeder have the means of selecting the male he thinks best calculated for the females he may happen to possess."

I have now, I humbly conceive, shown not only that it is the male parent which is capable of most speedily improving the breed of live stock, connected with agriculture, but that *the male is the parent*, from motives of sense and sound policy, which we can alone look to for the improvement of our breed of live-stock.

From the Farmers' Cabinet.

ICE-HOUSES.

In your July No. the question is asked, "who will answer to the request of a subscriber to be informed of the best plan of building ice-houses, the most suitable situation, &c. &c.?" As my experience upon this subject has been considerable, and differs, in some respects, from that communicated for the Cabinet in some of the succeeding numbers, I beg leave to trouble you with it, though at this late day; and ask the favor of a publication, if you shall believe there is in the premises any information conveyed worth the expense of printing.

The first great secret in constructing an ice-house, which will preserve the ice until the succeeding winter, consists in making it of considerable capacity; to contain from 80 to 100 full ox-cart loads. The next is, that it should be under ground, and in a porous soil. If this last cannot be obtained, the inconvenience may be obviated, where the location will admit of it, by a tortuous drain from the bottom, so constructed as to permit the passage of the water from the dissolving ice without admitting the introduction of the warm external air; or in a comparatively level situation, by sinking a well in the centre, deep enough to reach a porous soil; or, if this cannot be reached easily, of capacity sufficient to contain eight or ten hogsheads of water, and in both cases *walled* and not *filled up* with stone. The bottom of the pit may be so constructed as to have a fall from the whole circumference to this centre.

My ice-house is a pit eighteen feet square, and twelve feet deep, walled up with stone as an ordinary cellar—the wall eighteen inches thick, and continued one foot above the ground—the roof of shingles, and the ends boarded up with the space of an inch between each board, to admit a free ventilation. I fill it in the following manner. When there comes a good snow which *drifts* a good deal, I collect three or four ox-carts and half a dozen hands, and chosing a *drift* which has blown from a *grass-field*, the snow is cut with a shovel or spade into blocks of a size to be handled with facility, loaded into the carts, which are backed up to the door of the ice-house and tilted in. The business of one hand is to remain in the ice-house and tramp the snow *well* and *evenly* down. When the snow is in good condition, that is, when it is drifted into high banks, and thereby rendered solid, the filling is executed with great facility, economy and celerity. In the winter of 1837, my ice-house was filled to the comb of the roof in one day and a quarter, by seven hands and two ox-carts. The drift was within 150 yards of the ice-house. In the winter of 1838 I filled the same house in one day and a half by five hands and three ox-carts. This snow was not drifted. It was the last of March, and the prospect of getting drift

snow had failed. It was a wet snow. I had it rolled into large balls on one day, and on the next, when the water had pretty well drained out of it, it was put into carts and emptied into the ice-house. In the latter mode when the snow is wet enough to be rolled into balls with facility, the filling is executed with more expedition, and packing very close in the house, it does not dissolve so much as the driven snow. I have filled my ice-house with driven snow so white and clean, as to be used with equal gust in all modes in which ice is used; but when rolled into balls, even on grass-lands, it contracts impurities from the surface, from which it cannot be freed, which render it unfit for some few of the purposes for which ice is used. For the preservation of fresh meat, &c., and for the making of ice-creams, snow is preferable to ice, for an obvious reason; while for almost all other purposes it may be used with almost equal comfort and advantage. Snow is water converted into vapor, exhaled, free from all impurities; and frozen in the clouds, descends to us, and is an appropriate and beautiful, as just emblem of the highest moral purity. Ice is water congealed, with all its impurities, and these are not a few, and what is of more consequence, the most nauseous of them are invisible; at least this is the character of the water from which the ice is obtained, from which most ice-houses are filled. The filling an ice-house with *ice*, is, to most persons in the country, even when there is a stream convenient, and a pond even without the expense of constructing one, a job so laborious, expensive, disagreeable, and unhealthy to those actively engaged in its operations, that I have no doubt many are kept from the enjoyment of this wholesome (when pure,) and grateful luxury by these considerations alone. And why should this be so, since an ice-house filled with *drifted* snow, or snow wet enough to be rolled into *large balls, and left for twelve hours to drain before being put into the ice-house*, affords all the comforts, advantages and luxuries which can be derived from one filled with ice. Add to this, the cost of the former, it does not exceed $10, and may be executed in dry and mild weather, and exposes to no disease; whereas, if filled with ice, the work must be done while the weather is very cold; or if the ice be dissolving, it is not so good, and greatly exposes to disease those who are employed in the operation, and costs four times as much.

My ice-house is walled with stone. I fill it without placing any material betweens the wall and the snow. As soon as it is filled, and the ice sunken sufficiently for that purpose, which will be the first few days of thawing weather, I cover it well with wheat straw, say two or three feet thick, and as it begins to separate from the wall I push the srtaw down as far as it can be got, and occasionally do this during the summer. My ice-house frequently has snow in it when the season comes round for filling it.

ROBERT H. ARCHER.

Churchville, Harford, county, Md.

From the Farmers' Cabinet.

LIME.

Mr. Editor,—Your Cabinet, which is even now, I believe, the best publication on farming in this country, might be rendered more generally useful, I am sure, if your correspondents (who are numerous and able,) would always state the grounds on which they form their opinions. Advice, unsupported by example, is seldom followed; nor is the fact that the persons who give it most frequently use fictitious names, any incentive to its adoption, especially as the statements and conclusions made by them, however true, often appear ridiculous and absurd. If your contributors would all substantiate their statements, (by a relation) as I have intimated before, of the facts and experiments on which they are founded, and give too their names and residences, so that people may know on whom they depend, a very great stumbling block to the usefulness of your paper would be removed.

These reflections were produced by the singular circumstance, that although the Farmers' Cabinet abounds with testimony in favor of using lime, yet in this vicinity there are very few indeed who have been prevailed upon by it to give this invaluable manure a trial.

Now, Mr. Editor, if you think the following extract from my journal (free at least from the above objection) will have any tendency to arouse the people of this section of country to their own interest, you are requested to give it a place in your periodical.

In the spring of 1835, I planted a field containing twenty-five acres of land in corn; this field was a light and sandy soil, and had been in corn, oats, and pasture, without any admixture of clover, or manure, successively for a number of years; four hundred and seventy-five bushels of corn was received from this field this season, which was considered an uncommon large crop; the following spring this field was sown in oats, which at harvest was in some places scarcely worth cutting; the following fall it was sown in wheat, and in the spring following I sowed it in clover; the result of the wheat crop was, that I did not receive as much as was sown, and thinking the clover not worth keeping for the scythe, it was pastured until fall.

Profiting by former experience, I now determined to apply lime to this field; accordingly in the spring (1838,) I had it well ploughed, and 800 bushels of stone-lime carefully spread upon twenty acres of the same. It was then harrowed well until in good order, after which it was struck out lightly four feet square for planting corn, which was done from the first to the fifth of May. (My reasons for adopting the above method, was that the land being poor, and having, the fall previous to liming, been manured, I thought, by flushing it in the spring, and spreading the lime on top and harrowing well would be the best plan to produce a good crop of corn, as well as to improve the land speedily; and I would observe that the corn was not cultivated so much as I wished, owing to a storm which knocked it about so as to render it impossible to continue cultivating it.) I was careful in leaving but two stalks in each hill. The corn on the twenty acrs, which had been limed suffered but little if any, from the severe drought which took place this season, but the corn on the five acres having no lime on, suffered very much. The corn was cut up and shocked in the month of September, and husked out and measured in November. The corn was very dry

and good. The result of this crop was 743 bushels from the twenty acres which were limed, manured, &c. and 80 bushels from the five acres having no lime on, making in the whole 823 bushels of corn. It is the conviction of many farmers, that the corn crops this season would have been much larger, had not the drought taken place.

Let us now contrast this last crop of corn with the former one, and show the difference as to the land which was limed, manured, &c., and the land which was not, as the soil of this field was alike in quality previous to the above improvement.

		bus.
1835.	Produce of twenty acres, 19 bushels per acre,	380
1838.	Do. of 20 do. 37 do. do.	743
		363
	Or, produce of the whole 25 acres in 1835,	475
1838.	Do. of 20 acres, and 16 bushels per acre on 5 acres not limed, 80 bushels,	803
		328

Showing a difference between the former and the last crop, from 20 acres, of three hundred and forty-three bushels; and a difference between the former crop from the whole field, and the last crop, of three hundred and twenty-eight bushels.

It will appear then, Mr. Editor, that I have received this season 363 bushels of corn more from twenty acres of this field than the former crop, which was received from the same twenty acres. Or, taking in the five acres which had no lime on, I received an overplus this season of 328 bushels, there being that number of bushels of corn from the field, more than at the former crop.

We will now make some estimate as to the cost of the lime, and I think it costs nothing to those who use it judiciously upon their land. We will take into this estimate the overplus corn from the twenty acres of land which was limed, the overplus of which is 363 bushels.

Land (twenty acres)	*Dr.*
1838. May 1. To am't paid for 800 bushels of lime delivered,	$200 00
To spreading lime, &c.	8 00
Nov. Interest on the money, 7 mo.	7 00
	215 00
Supra,	***Cr.***
By 363 bushels of corn at 75 cts.	$272 25
By balance remaining on overplus corn,	$57 25

Thus it will appear, that after paying for the lime, and for carting and spreading it, and allowing the interest on the money paid, there still remains a balance from the overplus corn the sum of $57 25, which will amply pay for all extra labor and expense that the raising of this overplus of corn may be charged with. If such then is the case, which is to me as clear as that two and two make four, how is it that lime "*costs too much*," which appears to be the hobby-horse upon which too many land-holders in our neighborhood ride upon; and for which reason it is not used upon their lands. There are few individuals here who have lately given it a trial, and they have been fully satisfied as to the powerful effects of this invaluable mineral upon their land; and I hope that the time is not for distant when many of our land-holders in this neighboorhood will give it a trial. We shall not then fear but what our section of country will advanee too in the march of improvement.

R. M. BLACK.

Pencader Hun., N. Castle Co., Del., Dec. 25, 1838.

From the Silk Culturist.

EXHIBIT OF THE VALUE OF SILKS, IMPORTED INTO THE UNITED STATES, AND EXPORTED, FROM 1821 TO 1837 INCLUSIVE.

	Silks.	
Year.	Imported.	Exported.
1821	$4,486,924	$1,057,243
1822	6,840,928	1,016,262
1823	6,718,444	1,512,449
1824	7,204,588	1,816,325
1825	10,299,743	2,590,381
1826	8,327,909	3,367,015
1827	6,712,015	1,871,276
1828	7,686,640	1,270,461
1829	7,192,698	956,925
1830	5,932,243	1,061,054
1831	11,117,946	1,186,129
1832	9,248,907	1,337,073
1833	9,498,366	1,332,872
1834	10,998,964	1,036,057
1835	16,677,547	758,900
1836	22,980,212	762,730
1837	14,352,823	1,207,802

T. L. SMITH, *Register.*

TREASURY DEPARTMENT,
REGISTER'S OFFICE, *Aug.* 31, 1838.

From the Franklin Farmer.

THE SHORT-HORN FEVER IN KENTUCKY.

The Cultivator and Genesee Farmer were prophecying a short time ago, that the cattle fever in the west would soon reach a crisis. Those who are gifted with the spirit of prophecy never fail to find the facts which verify their predictions; and accordingly, the last number of the Cultivator, in noticing the price of a cow which was lately sold for $2000 in Kentucky, announces, that "this is the climax." The fever, having reached its crisis, according to the opinion of the Cultivator, we wonder that paper had not advised its readers whether the patient would die or get well. Judge Buel is unquestionably an excellent farmer and writer, but clearly he is no *doctor;* and if he were, he could not feel the pulse of a patient, at his distance, from Kentucky. But if our worthy cotemporary will honor our state by a visit, we promise to accompany him to the farm of every prominent breeder, and he will then be able to study and learn the true pathology of this disease, which at a distance, appears so frightful. We will point him to the glorious blue-grass pastures, and the immense fields of "meal, meadow and manure," abounding in Kentucky; we will show him estimates of the exports of live-stock from Kentucky to every quarter of the vast south; we will prove to him the great demand for improved animals of any discription, not only existing in Kentucky, but the whole valley of the Mississippi, and which cannot be met; we will point him to the spirit which is exhibited here of substituting superior for inferior stock, and to the willingness of paying at present a comparatively

high price in view of the vast advantage which must ultimately result from rearing good animals, instead of bad ones; and we think he will ackowledge that these are undoubtedly some of the predisposing causes of this great malady. Will you come, Judge?—We promise you shall graduate before you return to the north.

The "*climax*," however, we think, is not yet attained in Kentucky. The gentlemen who paid $2000 for a cow, have refused an advance on that price for her. One half of the $2000 cow and calf has been lately purchased by the owner of the other half, at an advance on cost. We do not pretend to say that higher prices than these will hereafter be given, for the animals to which we have alluded, are considered extra superior; but we are confident that the present current rates will be sustained for some time to come. There is not the least symptom of that *decline* which invariably follows a "*climax*." In saying this, however, we do not wish to be understood as advocating the propriety of every farmer's giving these enormous prices. For the good of the breeding interest, and in view of the more rapid and general spread of the Durham cattle, we wish they could be sold at prices that would justify every farmer in substituting them for inferior breeds of the country. Purchasers can in general, buy Durham cattle in Kentucy as low, if not lower, than they can get animals of equal quality in England, and hence the present current rates will not probably decline very shortly. But we should rejoice to announce such a decline as would enable all to purchase; although we think those enterprising pioneers who have risked so much money in introducing them into the country, ought to be amply remunerated. We learn that several individuals and companies in Kentucky, having heavy capital, have gone or sent agents to England to purchase more improved stock of every discription; and this at a time too, when, it is understood, the price of superior cattle has advanced fifty per cent in that country.

From the Genesee Farmer.

ELECTRO-MAGNETIC POWER.

In a late number of the Genesee Farmer, an inquiry was made as to the state of Davenport's electro-magnetic machines, and the probability of their affording a power capable of working thrashing machines of the kind noticed by the inquirer, as well as affording power for other purposes. To this inquiry we can only say, that nothing more is known of the state of Mr. Davenport's machines, than that he has for some months been at work upon one which it is hoped will justify the anticipations he and his friends appear to entertain of it as a moving power. At the same time, it may be remarked, that the experiments of others, if not of Mr. D., would seem to lead to the supposition, that the increase of power is not in proportion to the increase of size in the machines; and Dr. Page of Washington, who has tried various combinations of this power, and carefully watched the results, is of the opinion that it cannot be made applicable for the purposes requiring great power, or such as now require steam, or at least that a single machine cannot be made to exert such a power. Dr. Page's conclusion may be correct, so far as regards the working of a single machine; but we think he has himself furnished evidence, that any required degree of power may be obtained by a combination of small machines. In Silliman's Journal for January, 1839, is a paper on this subject by Dr. Page, in the course of which there is a drawing and description of a machine made by Mr. Davis, of Boston, of which Dr. Page says—"As a proof that electro-magnetism is susceptible of useful application where only a small power is wanted, a small engine was made by Mr. Davis in the month of July last, by the aid of which an individual gains fifteen dollars per day, by the simple operation of drilling the steel-plates for gas burners. I think this may be considered the first instance in which the mechanical application of electro-magnetism has been turned to profitable account." It appears perfectly evident to us, that a combination of the power of several such machines, like that of several boilers on a single steam-engine, may be made to exert almost any power wanted; whether the expense would be justified in the result, can only be determined when the nature and efficiency of this new agent is better understood. As it is, we must for a time be content with the old fashioned agents, horse, water or steam-power, and patiently wait for other developments and improvements.

From the Farmers' Cabinet.

THE SUGAR BEET AND THE RUTA BAGA.

Although the gentlemen who formed the "Sugar Beet Society," and introduced the seed among us, have not as yet seen their hopes realized by the establishment of sugar manufactories in Pennsylvania, yet they are entitled to the gratitude of our farmers for introducing to their notice an article which must, I think, ere long, be placed at the head of our list of root-crops, as cultivated expressly for the winter food of our stock. I am aware of the preference given by different root-growers to the carrot, the ruta baga, and the beet, and that preconceived opinion often prevents a fair trial of the merits of other roots.

I have the past season cultivated the beet and ruta baga, and were either one out of reach, I should rest satisfied with the other as one of the greatest luxuries for our cattle during the winter, and a rich mine from which to increase the quantity of manure, and consequently the crops to which manure is applied; I cultivated both, in order to arrive, by experiment, at some conclusion as to their relative value; the season has been unpropitious for all root crops, it is said; as for me, I cannot complain; one sixteenth of an acre planted with beets without manure, (but in a deep rich soil,) twice ploughed, and four times harrowed, gave 65 bushels; at the rate of 1,040 bushels per acre. One fourth of an acre of ruta baga on an inferior piece of ground on which was put three two-horse loads of manure, twice ploughed and three times harrowed, gave 120 bushels; equal to 480 bushels per acre.

The beets had a fair chance; it was nothing but straight-forward work with them from planting until gathering time; but the poor ruta bagas had

up-hill work for six weeks at the beginning; the drought, the grass-hopper and the turnip flea, did their work so effectually that I abandoned the crop in despair; however, when the rains came on, many seeds which had lain in the earth vegetated and grew so luxuriantly as to give the above result, where every one who saw the ground predicted there would not be five bushels; with a fair chance, I firmly believe, my quarter acre would have yielded 250 bushels.

As to the relative value of the rival crops, I cannot say any thing with accuracy farther than that when our stock of beets was exhausted, and we commenced feeding the ruta bagas, although I have not been able to detect any difference in the *quantity of milk* in the pails, the *quantity of butter on the second week of turnip feed was reduced one-third*, at which point it still continues; the quality is about the same.

I have no other facts in possession which will warrant me in giving the beet the preference. The cattle eat the turnips with the same eagerness as the beets, and present the same healthy appearance. The horses and store-hogs I find give preference to the beet, the sheep to the turnip, and all the fault I have to find is with myself for not raising enough to let the above mentioned worthies comes in with the cattle for their daily rations of roots. Others have no doubt dipt into this subject more deeply than I have, and are consequently much better qualified from experience and longer observation to arrive at more positive conclusions; will they let us hear from them?

MAHLON S. KIRKBRIDE.

Morrisville, Jan. 15th, 1839.

From the Farmers' Cabinet.

ON THE PREPARATION OF ORCHARD GRASS-SEED FOR SOWING

Orchard grass-seed is always in the hull or chaff, and is very light, not weighing more than 12 or 14 lbs. per bushel, and if sown without being first wetted, it is very liable to fail though the seed be ever so good. It is recommended to spread it out on the floor, and with a watering pot to sprinkle it, and then mix it well with a rake, and then let it lay till the next day, when if necessary, it may be again sprinkled with water, and mixed up well; and before sowing it, mix plaster-of-Paris with it to bring it to a proper state for sowing. The water and plaster will increase the weight, and cause it to settle close to the ground and enable it to take root. This is one of our most valuable and profitable grasses, and every care ought to be taken in sowing it properly, for on this depends the success of the crop. It is generally sown much too thin; two bushels to the acre is preferable to one by just one half. Remember that whatever is worth doing at all is worth doing well. R.

From the Hampshire Gazette.

EXCAVATING BY STEAM.

In excavating for the rail-road near Springfield, a machine is made use of, which is operated by steam-power. Similar machines are also used in other places on the road. The machinery of this machine, which we are not able to describe, is contained in a small building about the size of an Irish hut, which is placed on wheels, and can be moved as necessity requires. The *scoop, or scraper*, (we are ignorant of the proper name of it,) is something like a coal-hod, with one edge sharp, and containing three or four large teeth. A huge bail is attached to the mouth of the scraper, to which is connected a chain that passes over a pully at the extremity of a projecting crane, and communicates with the machinery within the building; the other end of the scraper is united to a beam, or lever, which passes under the crane. The scraper is let down to the bottom of the excavation, the mouth of it sustaining a downward inclination, and is thus drawn up through the gravel by the chain attached to the bail, and filled. It is then swung off by means of the crane, over a gravel car, the bottom removed by a jerk upon a cord, and the contents discharged. Each scraper fills a car full, and every operation occupies about a minute. It is said to excavate as rapidly as 25 men—making a saving of about 20 men. It can be used to advantage, we presume, only in rather light soils.

The Irish view it with a jealous eye, and it is necessary to guard it constantly to prevent their destroying it. They are not pleased with so powerful a competitor.

From the Maine Farmer.

CARE OF COWS.

Some farmers are particular to have their oxen and horses well tended and well fed, but pay no attention to their cows. This is one of the errors which ought to be corrected. Cows that give milk should have a warm barn, the best hay and a feeding of roots every day, and the extra milk will doubly remunerate the trouble and expense. And cows that are dry, and expected to calve in the spring, should certainly be carefully tended and warmly housed to keep them in flesh and prevent them from contracting any disease which will be likely to affect them after they have calved. Cattle are as liable to take cold from exposure as men are, and by paying a little attention to their comfort you may save them a great deal of suffering, and yourself much loss. A great portion of the accidents which happen to young cows with their first calf, are owing to poor keeping, exposure to cold or some accident during the winter, the effect of which is not manifested until after they have dropped the calf. A mess of raw potatoes and a little salt regularly given once or twice a week to cows that will calve early, is very beneficial. It will keep their hide loose and have a tendency to produce a healthy action throughout the whole system.

While on this subject, there is one practice more we will name which is followed by some farmers, that ought to be abandoned. This is the practice of putting the hay over into the crib immediately under their cattle's noses. In this case they necessarily breath on it, and then will not eat it. A board from the bottom of the partition that separates the "tie-up" from the barn floor, should be removed, and the hay placed against the aperture within their reach. By feeding in this

way you can give them as much as they will eat, and they will make no orts.

From Arthur Young's Travels in France, (in 1787, '88, '89.)

ON THE CULTURE OF SILK IN FRANCE.

QUERCY.—*Caussade.*—In the avenue leading to this town, two rows of the trees are mulberries, and these are the first we have seen.

Montauban.—Many mulberries here, in rows; and under some of them four rows of vines, and then six or seven times the breadth of corn. When the leaves are not in time for the worms, or are destroyed by frosts, they are fed with lettuce leaves; and if no lettuce, with cabbage; but the silk is so worthless, that the failure is reckoned nearly equal to having none at all.

Toulouse to Noé.—Mulberry trees are here worth from 6 *sous* to 20 *sous*, and 30 *sous* each, per annum, according to their size.

Noé.—Mulberries worth up to 3 *livres* per tree, per annum. But silk worms have missed much for three years past.

Norbonne.—Many mulberries; all with pruned flat heads.

Pinjean.—Olives are a beneficial article of culture, but they prefer mulberries, because they yield a crop every year. On four *sétérées* of land they have sixty trees; and at the same time the land yields barley or oats, mown for forage, of which the four *sétérées* gives 60 quintals, that sell at 33 *sous* the quintal. Single mulberries have paid as far as two *louis* each, and many one *louis*. If four *sétérées* equal two acres, there are thirty trees on an acre, and the acreable produce of forage will be 52 *livres*, or 2£, 5s, 6d.

Nismes to Sauve.—Seven mulberries on an English rood.

Quésac.—Mulberry leaves sell commonly at 3 *livres* the quintal. A tree yields from one to eleven quintals: two, three, and four are common. Gathering the leaves cost 12 *sous* the quintal. Fifteen quintals of leaves are necessary for one ounce of *grain*, [the seed or eggs of the worm]: 20 *livres* the mean price of silk per lb.: reckon that an olive tree pays as well as a mulberry.

Many mulberries about Quésac, and some on very poor dry land. In grass-fields the ground is kept dug around them, as far as the branches extend. Remark some stones laid around many trees, for some distance from the stem.

Eight trees in something less than an English rood.

By information, almonds, in Rouverge, pay better than mulberries, and with much less expense and attention; 3, 4, 5, and 6 *livres* a tree.

Gange.—Many fine mulberries about this place, which yield from 3 *livres* to 8 *livres* a tree in common, young ones excluded. They yield to twelve quintals of leaves; in general, three, four, or five. The price varies from 3 *livres* to 10 *livres* the quintal. They are much more valuable than olives. This year the great cold in April destroyed the young buds and hurt the crop greatly. They never think of giving any thing to worms but the leaves; have heard of twenty things, but treat the idea with the greatest contempt, knowing as they do, by the fabric, the worthlessness of silk, if the worms are so fed.

Lodeve.—Mulberries are more profitable than olives; yield three, four, and five quintals of leaves, which fell, in common, at 3 *livres*.

Mirepoix.—Mulberries are here, but none after, in going from Carcassonne to St. Martory.

Auch.—A few mulberries near the town.

It is here to be noted, that from Mirepoix to Bagnere de Luchon, and from thence by Pau to Bayonne, and back by Dax to Auch, a line of much more than 300 miles, I saw no mulberry trees.

GUIENNE.—*Leyrac.*—Some few mulberries.

Aiguillon.—A few trees for some miles before this place. Behind the chateau, in the town, is a large plantation, formed by the late duke; which, being in the fine vale of the Garonne, the land is cultivated as the rest, under hemp and wheat; but both those crops are less than middling, the expression of the person who gave us the information, on account of the roots and shade of the trees. The duke gives the leaves to the people in the town, furnishing also the wood, boards, grain, and whatever else is necessary for the business, and has in return the third part of the silk they make. Every one in the place, and all round the country, say that he loses considerably by it; asserting, that the land thus occupied is worth 500 *louis* a year; that the crop of silk is so precarious that he has had eight quintals, and in other years only three, two, and even one; so that on an average, his third part gives only 150 *louis*, and the crops under the trees cannot make up one-half of the deficiency. They also maintain, that the land is too rich for mulberries; and, to prove that they are right in their ideas, they quoted many gentlemen in the neighborhood, who have grubbed up their mulberries.*

Tours.—They have in the neighborhood of this city many mulberries, insomuch, that the value of the raw silk has amounted, as they assert, in a good year, to a million of *livres*. I walked several times into the country to view the trees and make inquiries. Many of the corn-fields are regularly planted all over; the gardens are surrounded with them; and the roads and lanes have rows of them. The large good trees, in a favorable year, give to the value of 4 *livres*, but not in common. I viewed several plantations; containing old, young, good, and bad, that gave on an average, one with another, 30 *sous*, which seemed, from various accounts, to be a general medium; it, however, excludes very bad years; such, for instance, as last spring, in which they had no crop at all, the frosts in April (note, this is certainly one of the finest climates in France,) having entirely destroyed it. I saw several trees which gave to

---

* All the places before named, are in the southern extremity of France. Toulouse is as far south as the northern shore of the Mediterranean, near Montpellier. Tours, in Touraine, the next named place, is on the Loire, and about midway between the northern and southern extremities. Since Young's account was written, the mulberry plantations and silk-culture of Touraine have greatly diminished, as appears from an inquiry into the causes, instituted by the Royal and Central Agricultural Society of France, as published in the *Annales de l'Agriculture Francaise*, for 1834.—See page 257.—ED. FAR. REG.

the amount of 10 to 15 *sous* at ten years old, and 30 *sous* at the age of fifteen years. Plants, at two years old, are sold at 3 *livres* the hundred: at three years old, 4 *livres*: and good trees, proper to plant out in an arable field, 20 *sous* each. In regard to the distance, at which the trees are planted, they have no general rule. I measured many distances, in a large corn [wheat] field, and found them at two rod square, at an average: in another, they were six yards by nine; which trees gave 40 *sous* on a medium: round a garden they were at five yards from tree to tree: a field, entirely cropped with mulberries, had them in rows at one and a half rod; and between the rows another of small plants, in the manner of a hedge. If sixty square yards are allowed per tree, there will be eighty on an acre, and if they give 30 *sous* each, it will amount to the vast produce of 5 *livres* per acre, besides what can be gained under them; it would, however be a question, whether this under-crop would make up for bad years, that yield nothing? Around field, in roads, corners, &c., the profit will be greater. It is remarkable, however, that with all this profit attending them, they do not increase about Tours; yet not one acre in a hundred adapted to the culture, is so employed, which shows either a very uncommon want of capital, or doubts whether the cultivation is so profitable as it appears to be from such information.

In order to spread the cultivation, government established nurseries, and gave the trees gratis, until private nurseries were opened; and in winding the silk much assistance was also given, to the loss to government, of 20 *sous* per lb.; but now the business is carried on without any premium of that sort. Probably such encouragements were of very little use; the abuses incident to all governments would direct such assistance to be given where it was not wanted; and in that case it would, by raising disgust, do mischief.

They plant no mulberry but the white; the black they think very bad.

NORMANDIE.*—*Bizy.*—Having read, in the memoirs of some of the agricultural societies in France, that the marshal duke de Belleisle made a very considerable and successful experiment on the introduction of the culture of silk in Normandie, on his estate at Bizy, I had long ago made a note of it, for examining; as the steps which proved successful in such an attempt in Normandie, might probably have the same effect, if applied in a climate so similar as that of England. I went to Bizy with this view, and did what I could to find out the proper persons, concerned in this undertaking, to give me the information that was necessary.

Five-and-thirty years ago, the duke began by making some extensive plantations of mulberries, to the amount of many thousand trees: they succeeded well; and, in order to draw all the advantage possible from them, as the people in the neighborhood were ignorant and awkward in the process, the duke, by means of a friend in Provence, procured a man, his wife, and all his children, well skilled in the whole business of the silkworm, and established them at Bizy, in order to instruct his own people in it. By these means, he made as much silk as the produce of leaves would admit. I wished to know to what amount, but could not ascertain it; but the duke continued his plantations of mulberries during nine or ten years. I tried hard to find out some descendant or remains of this Provencal family, but in vain; the man was dead, the woman gone, and the children dispersed; the estate, on the marshal's death, having been sold, and coming into the possession of the duke de Penthievre, made all these circumstances the more difficult. The great object was, the success of the experiment; this inquiry was uniformly answered by several persons:—it had no success at all. It was a favorite project of the duke's, and supported, with perseverance, for many years, until his death; but the silk did not pay charges: and though he very liberally offered leaves to the poor people, on easier terms than they are supplied with them in the south of France, and even gave trees; yet nothing more was done than what his influence and authority forced: and the Provencal family, after ten years experience, pronounced that the climate would do to make silk, but not with profit. To his last hour the duke had silk made, but not an hour longer; the practice had taken no root: the country people, by whom alone such an undertaking could prosper, saw no inducement to go into the scheme, and the whole fell at once into utter ruin and neglect on the duke's death; so that the trees themselves were by degrees condemned, and the number remaining at present are inconsiderable. Certainly no positive physical proof that silk will not do in Normandy, but it is a presumptive one, pretty strongly featured. Go into Languedoc, Dauphiné, and Provence, and the poor people do not want the exertions of marshals of France to induce them to breed silk-worms; they have a much more powerful inducement—the experience that it is their interest: had this inducement been present at Bizy, the culture would, in more than ten years, have taken root.

BOURBONNOIS.*—*Moulins.*—Mons. Martin, gardener of the royal nursery here, who is from Languedoc, cultivates silk with great success; he was so obliging as to be as communicative as I could wish. Trees of two or three years old yield a few leaves, but to be stripped cautiously: at eight or ten years, they come very well into yielding. One ounce of *grain*, that is, of the eggs of the worms, requires twenty quintals [one hundred weight English] of leaves, and yields from 7 lb. to 9 lb. of silk. He has made as far as 300 lb. in a year, the produce of 3,000 lb. of cocoons; and the worms that year eat 12,000 lb. of leaves every day, for four or five days together, and fifty persons were employed for eight days. The whole business of hatching and feeding employs a month; the winding is afterwards done at leisure. For care and attendance of the worms, gathering the leaves, and winding the silk, he gives one-fourth of the produce, or about 6 *livres* the pound of silk; for spinning 3 *livres*; in all, 9 *livres*; rest profit, 15 *livres*. The men earn 20 to 24 *sous* a day, and the women 8 to 10 *sous*. He prefers this climate for the business to that of Languedoc, though stoves are here necessary for keeping the room to the temperature of 18 degrees, Reaumur; whereas in Languedoc they do without fires. The season here varies from fifteen to twenty days; the

* Normandie—in the northern part of France, and on the southern coast of the English channel.—ED. F. R.

* Bourbonnois—east of the central part of France.

earliest is the 24th of April, and the latest the 15th of May. If the leaves are not ready, he keeps the hatching back, by lodging the *grains* in a cool cellar. He has known one tree in Languedoc yield 80 *livres* a year in silk. Moulins and its environs make to the value of 60 or 80,000 *livres* a year. Mons. Martin sells trees, of two years old, at 20 *livres* the thousand. The distance of planting, if for crops under the trees, thirty feet; if no crops, twenty feet. Of the writers that have treated of this subject, he prefers Mons. Sauvages.

In the particulars of an estate to be sold, was one article relative to the product of silk; mulberries enough for 12 oz. of grain, yielding 60 lb. of silk.

VIVARAIS.*—*Maisse to Thuys.*—First meet with mulberries in going south from Auvergne. They yield very largely here; I am assured, that many trees, in a good year, reach 12 *livres* each. That in four years after planting, they begin to produce leaves enough for stripping. The best of them are all grafted. Trees, fifteen years after planting, have, in a very good year, yielded six *livres*. I was shewn a small field that yields, one year with another, 120 *livres;* I stepped, and found it 50 yards by 70 yards, or 3,500 square yards, (£7. 4*s*. 4*d*. per English acre); yet the trees were not regularly planted, nor fully; and this besides the other produce of the ground.

Aubenas.—The silk-mills here, which are considerable, purchase the cocoons of the farmer, at 28 to 32 *sous* the pound. The mulberry trees here are very large.

Villeneuve de Bergue.—Twenty quintals of leaves give one quintal of cocoons, and one quintal of cocoons 10 lb. of silk. They reckon that the waste, *débris* and *dechet*, pay the spinning. Eighteen trees, of seven years age, pay 28 *livres* a year; but some trees, of ten years old, have been known to give 3 *livres* each. Three-fourths of an arpent *de Paris* have been sold for 400 *livres;* the soil all rock and stone, but calcareous. The trees are grafted before transplantation, which is at three years old; price, 12 and 15 *sous* each. The second year after planting they begin to gather. The price of the leaves 3 *livres* the 100 lb.; and of gathering 10 *sous* the quintal. The culture is reckoned more profitable than vines, which are sometimes grubbed up, to make way for mulberries. Of the sorts, the *rose feuille* is best. In the road to Viviers, I remarked a tree 2½ feet in diameter; and very large ones are in the bed of a torrent, where no earth (only stones) is visible.

DAUPHINE.†—*Montélimart.*—Silk is the great produce of the country; they have mills, where the cocoons are bought, at 27 *sous* the pound. An ounce of *grains* gives 60 lb. of cocoons, and 12 lb. of cocoons 1 lb. of silk: forty middling trees, each yielding a quintal of leaves, being required to feed that proportion of worms. The *grains* are hatched by artificial heat, and the operation demands wood to the amount of 24 *livres* to each ounce of grains. A common method of conducting the business is, for the proprietor of the land to find trees and half the *grains*, the poor people the other half and all the labor; and the parties divide the produce between them. The impediments in the culture are,—1. climate; frosts in the spring destroy the leaves, and, if at a critical time, there is no remedy. I demanded if they had no succedaneum, in such case, in feeding the worms with the leaves of some other plants? The answer was, that experiments had been made upon that point, without any success; that the idea, however, was nonsense, for the quantity of food was so great, as to render it absurd to think of providing it, not for a certain want, but merely a contingent one; the expense of such a conduct would absorb all the profit. Nor is it frosts only that are dreaded; great and sudden heats make the worms fail, and they labor very poorly. 2. The extreme labor of attending the worms, is a great objection to the business; it is, for the last fifteen days, so severe as to kill many; and, for the last eight days, they are cleaned every day.

Upon a comparison of the culture of the olive and the mulberry, it was remarked to me, that one great advantage of the olive, was the contracted space in which the roots feed, consisting chiefly of a tap-root and fibres, which made the crops sown under them good; but a mulberry threw out a profusion of roots, fifteen or twenty feet around in every direction.

They have been known, at eleven years growth, to yield 200 lb. of leaves each tree.

The mulberry is found not to like water; for there is in the watered meadows a mound of earth, to keep the water from the roots of these trees.

When silk-worms are ready to spin the cocoon, if they are cut in halves and thrown into vinegar, each worm gives two transparent ligaments, very strong, for making fishing lines, &c. &c.

Loriol.—Mons. L'Abbé Berenger, curé of this place, has given an uncommon attention to this culture; he was so obliging as to give me the result of many years' experience on this interesting subject.

Time of sowing.—There are two seasons; the first, with the fruit, fresh, at the end of June—the second in May, with the seed of last year, dry; and this is better, because the June sowing suffers sometimes, if frosts are severe, or the weather is both cold and humid. When sown dry, if too early, and cold weather succeeds, they are apt to fail. They are often watered.

Transplantation.—In April following, those that were sown in May are transplanted, three feet every way, into the nursery; only half the plants (the best) being drawn, the rest are left till the year after. They are never transplanted a second time.

Sort.—The *feueille rose*, with white or grey fruit, is the best; black fruit not known here, but said to be good for leafing late, and escaping frosts in the spring.

Grafting.—It is best to graft, in the nursery, in May, when they are three years old, at the head, with grafts cut in February preceding, and preserved in sand in a cellar: these grafts are branches three feet long, which are buried in sand, except four inches at the end, for three or four knots to shoot; if all are buried in the sand, all the knots will shoot. At grafting cut off those knots that have shot out, and use the rest. The time is after gathering the leaves of the standard to be grafted,

*Vivarais—more south. About midway between the centre and the Mediterranean.

†Dauphiné—in the south-eastern part of France, and in the same latitude with, and adjoining Piedmont in Italy.

when the plants are 5 feet, or 5½ feet high. One year after grafting, transplant, that is, about April. Graft three or four branches.

Soil.—Good and humid sands, and sandy loams are the best: warm, forward, rich, and friable: rocky and stoney soils do well; but all clays are bad. On the lightest stoney lands, the trees come into bearing much sooner than in the rich vale, but these last vastly longer; on the rich vale-land, two hundred years are a common age for them.

Planting.—In bad land plant at eighteen feet square, in moderate at twenty-four, and in very good at thirty-six; and, after seven or eight years, there can be no crops under them, if at these distances. There are two sorts of trees, the one large standards; and the others dwarf ones, which they call *murier nain;* an arpent contains, of course, many more in number of these than of the others; and they yield, for the first ten or fifteen years, a larger produce, but afterwards the greater trees are more productive. The dwarfs are best for being set in rows, for ploughing between; they are grafted at 1½ feet high; are never watered. The price of trees 25 *sous* the hundred, at the age of one or two years; the great trees, at four or five years, for grafting, 20 *sous* each, at present 15 *sous* each, and grafted. The operation of planting is performed by digging a hole 6 feet square, and 2½ or 3 feet deep; and they commonly lay dung upon the roots.

Cultivation.—The attention with which they manage the trees after planting, merits the highest commendation—after they have been planted two years, a trench is dug around each tree, about two feet deep, which is left open all winter, and filled up again in the spring; the year following, another is dug, more removed from the tree, which is managed in the same manner; and so on, every year a trench, till the whole land is stirred as far as the roots extend. This appears to be a most excellent system, and preferable to trenching the ground at first; as in that way much of it is consolidated again, before the roots of the young trees reach it.

No crops whatever to be sown on the land after the trees are of a size to have their leaves gathered; as much is lost in leaves as is gained by such crops.

The trees should never be pruned at any other season than March, and but once in two years; the wood pays the expense: they receive one digging per annum, at 6 *livres*, and a hoeing at 3 *livres* per arpent.

There is another admirable practice known here, and used by all skilful cultivators, which is, that of washing the stems of the trees every year, in May, for four or five years after planting. Mons. L'Abbé Berenger always practises this with great success.

Produce.—For the benefit of the young trees, they ought not to be stripped for seven or eight years after planting into the field; they will pay well afterwards for this forbearance; but the practice is not common. I viewed a young plantation of Mons. Blanchard, at present in the national assembly, who is famous for his attention to his mulberries; the trees were six, seven, and eight years old, and none of them had ever been stripped, and their appearance was very flourishing. Mons. L'Abbé Berenger approves the practice, but has not adhered to it; his trees, however, are very fine, and do not complain; one plantation, of eight or ten years growth, that have constantly been stripped, are, notwithstanding, very fine. There are forty on 400 *toises* of land, that this year produced, each tree, 8 lb. of leaves. The beginning of February he planted the land under them with potatoes, which were dug in August, and produced forty quintals; among these potatoes maize was planted in April, in squares of five or six feet, and the produce of that will be five or six quintals, at 8 *livres* the quintal. He shewed me another plantation, of an arpent, of very fine and flourishing dwarf trees, which yielded this year 8 lb. of leaves each tree, and 300 lb. on the arpent. They are ten years old; no crops have ever been sown under them.

The produce of leaves may be estimated at 50 lb. from a tree of a *toise* square. The greatest produce known is 10 quintals, from a tree of fifty years old. At twenty years the medium is two quintals. They increase till sixty years old, but are in good perfection at twenty.

The Eggs.—A paper of nine inches by fifteen inches, covered with small leaves, stuck full of worms, gives one quintal of cocoons; and this is what they call one ounce of *grains.* But proportions will not hold, for the produce is not increased proportionably to an increase of quantity.

Hatching.—Retarding the hatching of the worms with particular views, is, in many circumstances, impossible. When once the heat of the atmosphere is come to a certain pitch, the hatching cannot be retarded by cellars. Mons. Faujas remarked, that in June, they would hatch in an ice-house; which shews that at a certain age they will hatch in spite of cold. They never, however, trust to the natural heat for hatching them, which always does it too slowly; it is done with the assistance of fire, and in the month of May. They begin to hatch at 20 to 22 degrees (Reaumur); but artificially it is done at 24 degrees. When the eggs happen to have been put in a cellar, at 10 degrees, their common temperature, they afterwards hatch with difficulty, and never well; always best when they have to undergo but a moderate change.

Feeding.—In this business all sorts of food, except the mulberry-leaf, is rejected, at the first mention, as the most ridiculous, impracticable, and impossible idea, that ever entered the head of a visionary; and never could be conceived but by those only who amuse themselves with a few worms, without taking the trouble of calculating quantity, expense, and quality of silk.

For one ounce of grain, a room of 10 feet by 14 feet, and 12 feet high, is necessary; but the larger the better, and with windows only to the north. There should be ten tables, or shelves, 6 feet long, and 4½ feet broad, one 18 inches above another; the first expense of which 60 *livres.*

Till the 18th of April, there is here no security against frosts. Two years ago there were many leaves before that day, and most people began their operations; the leaves were all cut off, and they lost the year entirely, for it is three weeks before the leaves come again. Mons. L'Abbe Berenger would not trust appearances; did not begin till after that day, and had as good a year as at any other time.

The expences are usually borne between the parties, and amount to half the produce, not including the keeping the utensils in repair. But if

they are paid by the owner of the mulberries, some of them amount to as follow:—gathering the leaves, 12 to 15 *sous* the quintal; for gathering the dwarfs, only half the price of the others; wood, 15 *livres* for 1, 2, or 3 oz. of eggs in one room; 30 *livres* for 6 oz. because in two rooms; 22 *livres* 10 *sous* for labor in the house; spinning, 40 *sous* per lb. of silk. The waste is worth 20 *sous*, therefore the expense is 20 *sous*.

For the last four or five days, eight men are necessary to gather leaves for 20 oz. of gain, their voracity being incredible the latter part of the time.

The price of the leaves, if bought, is 4 to 5 *livres* the quintal, never at 3 *livres*, but has been at 10 *livres*. From 15 to 18 quintals of leaves give one quintal of cocoons, and one of cocoons gives 9 lb. of silk. Cocoons are sold at 26 *sous* the pound; silk, on an average, at 19 *livres*. The leaves, dissected by the worms, are dried, and kept for hogs, sheep, &c., being worth four *livres* the quintal; and an ounce of grain yields two quintals of such: and the dung of the worms, from an ounce, is worth 4 *livres* more, being excellent; the best indeed of all others.

Two brothers here, Messrs. Cartiers, have had as far as 80 quintals of cocoons. Mons. Berenger's three hundred trees on an arpent, at 8 lb. of leaves each, are 24 quintals; and, at 4 *livres* the quintal, amount to 96 *livres;* and as 16 quintals of leaves gives 9 lb. of silk, at 19 *livres*, it is 171 *livres*; and for 24 quintals 256 *livres*, the half of which is 128 *livres;* hence, therefore, to sell the leaves at 4 *livres* the quintal, does not answer equally with half the produce, (128 *livres* per arpent *de Paris*, is £6. 4*s*. 3*d*. per English acre.)

Provence.*—*Avignon.*—At 10 years growth the mulberries yield a considerable produce; at that age they give 100 lb. to 150 lb. of leaves, but not common. For one ounce of grain, five or six very large trees are necessary; or, if the leaves are bought, to the amount of 24 to 30 *livres*. The ounce will give from 40 lb. to 50 lb. of cocoons, or 5 lb. of silk, but more commonly 12 lb. of cocoons for 1 lb. of silk. Gathering the leaves 10 or 12 *sous* the quintal, one with another, dwarfs and standards. The waste pays the spinning.

Aix.—Mulberries, beyond all comparison, more profitable than olives; will give 3 or 4 *livres* per tree, more regularly than olives will 10 *sous;* but the great plantations of olives are on barren rocks that will not do for mulberries.

Tour d' Aigues.—One ounce of grain requires 15 quintals of leaves, and gives 50 lb. of cocoons; that is, 50 lb. in a small undertaking, like the house of a poor family; but not more than 30 lb. in a large building. Mons. the President has, however, had 75 oz. of grain that gave 40 lb. one with another: 14 lb. of cocoons give 1 lb. of organzine silk.

On good land, twenty trees, of ten years old, will give 15 quintals of leaves. The waste, with the addition of 10 *sous* per lb. will pay the spinning. Wood is 12 *sous* the quintal, and 1½ quintal will wind and spin 1 lb. of silk: and one quintal of charcoal will make 3 lb. of silk. The common calculation is 10 quintals of charcoal for 1 oz. of grain.

Labor and fuel, 40 *sous* per lb. of silk, exclusive of gathering the leaves; but the common method is to find the trees and the grain, and give half the produce for all the rest. The whole business, exclusive of winding and spinning, employs exactly a month.

Hyeres.—This article is here but little regarded; the number is not considerable, nor do they pay nearly the same attention to them as in Dauphiné. A tree of twenty years pays about 30 *sous;* and some, of a very great size and age, 6 *livres*.

Frejus.—Close without the town, on the banks of a small canal of irrigation, are five or six of the largest mulberries I have seen, growing close to the water's edge; from which it should appear, that they have here none of that objection to water which was mentioned to me at Montélimart.

Estrelles.—At the inn here there is a mulberry-tree which yields black fruit, and leaves of a remarkable size. I asked the master, if he used them for silk-worms? *Never*, he replied, *they are no better for them than elm, oak, or pine leaves: it is the white mulberries that are for worms.* So inaccurately understood is this point, even in the silk countries; for in Languedoc they told me, all sorts were given indiscriminately. This tree would be worth 2 or 3 *louis* a year.

To these notes, taken by myself, I shall add a few others, for the more general elucidation of the subject.

Languedoc yields, in a common year, from 500 to 1,200 quintals of silk.* I have searched books in vain for information of the quantity of silk produced in all France; but I find the number of looms which work it, by one account, 29,000,† of which 18,000 at Lyons; but by a later and more authentic account, there were at Lyons only 9,335 looms, which worked about 2,000,000 lb.‡ and in all France 17,500 looms; which, in the same proportion, would work about 3,763,000 lb. In 1784, she imported raw silk to the value of 29,500,000 *livres*, and in 1787, to 28,220,000 *livres;* call it 29 millions, and 20 *livres* the mean price per lb. it is 1,450,000 lb.‖; which will leave about 2,310,000 lb. for the home produce, or 46,200,000 *livres*, which is so gross an impossibility, as to ascertain to a certainty, the exaggeration of the number of looms, and confirms, in a fresh instance, the many errors in the new Encyclopædia. If Languedoc produces only 100,000 lb. all the rest of the kingdom cannot produce twenty times as much; for the culture is confined to three or four provinces, except small quantities, that enter for little in a general account. I was informed, at Lyons, that the home growth was about a million of pounds weight, of two-thirds of the value of the imported per lb. or about 20 *livres*. This makes the growth to the value of 20,000,000 *livres* or £875,000. If so, Languedoc must produce more than 100,000 lb. for that province must be at least one-fourth, if not one-third of the whole. I must confess I

* Provence—the south-eastern extremity of the kingdom, and bordered by the Mediterranean.

* *Considerations sur le Commerce de Bretagne*, par Mons. Pinczon du Sel des Mons. 12 mo. p. 5.

† *Lettre sur les Muriers and Vers a soie, Journal Oeconomique*. 1756, vol. ii, p. 36.

‡ *Encyclop. Methodique Manuf.* tom. ii, pt. 2, p. 44.

‖ A very late writer was strangely mistaken, in saying that France imports 20,000,000 of pounds weight. *Mr. Townshend's Journey through Spain* vol. i, p. 52.

have my doubts upon this point, and think that even one million of pounds much exaggerated, for I crossed the silk country in more than one direction, and the quantity of trees appeared inconsiderable for any such produce. But admitting the authority, and stating that the kingdom does produce to the amount of 8 or £900,000 sterling, I must remark, that the quantity is strangely inconsiderable, and seems to mark, that the climate has something in it vastly inferior to that of Italy, for the production of this commodity; in which country there are little principalities that give more than the whole kingdom of France. Yet, to human feelings, there is no comparison between the climate of France and that of Italy; the former is better, beyond all question. But the spring frosts (found in Italy also,) are what bring the greatest destruction on this culture, and will forever retard its progress greatly in countries exposed to them. In 1788, there was a general failure in the south of France, yet across the Pyrenees, in Catalonia, the crop was abundant, merely because the spring frosts did not pass those mountains.

In the districts and spots of the southern provinces, where the climate has, from experience, been found favorable to silk, there is no want of exertion in following it; and about Loriol and Montélimart, it is cultivated with more energy than in any part of Lombardy; yet at small distances there are no mulberries, though the proprietors are as rich and as industrious as where they are found. The same observation is to be made every where, and seems to mark a great dependence even on the locality of climate, if I may hazard such an expression. Where the culture succeeds well, it appears, from the preceding minutes, to be highly profitable, and to form one of the most beneficial objects that can attract the attention of the industrious.

ESSAY ON THE PRODUCTION OF SILK,

AND THE PECULIAR ADVANTAGES OF VIRGINIA FOR THE CULTURE.

(By the Editor.)

I. *Sketch of the natural history of the silk-worm.*

The silk-worm, like all other insects which are winged in their most perfect state, passes through three different conditions of existence, three entirely different kinds not only of outward form, but of instincts and of habits; and in each one of these forms and conditions, the animal is as different from either of the others, as a beast is different from a bird, or either from a fish. These transformations of insects are of such common occurrence, and so general, as scarcely to be noticed by most persons; and yet they are so wonderful, that if they were rare, or the knowledge of them depended upon the testimony of others, the facts would not receive belief. Small and humble as these may be considered among the works of the great creator of all things, there are none which more strikingly display the wisdom of design, and the wonders and beauty of his workmanship. With variations of time, form, and circumstance, as numerous as are the different kinds of winged insects, all of them agree in being subjected to these three successive changes: First, from the egg is hatched a a worm or maggot, which merely devours voraciously its proper food, for its appointed time. Secondly, it becomes a chrysalis, of contracted size, and of form and appearance altogether unlike, cased in a close envelope, in which it remains dormant, motionless, and apparently lifeless, and without food or respiration, for days, or months, or even for years, according to its kind. Next, it bursts this envelope, and comes forth a winged animal, which refuses its former chosen food, and is incapable of existing in the habits or condition of either of its previous forms. Many of these last forms are among the most beautiful and splendid of the animal kingdom; and nothing but the imperfection of human vision prevents remarkable beauties being seen to decorate the most common, and the least noticed, of flying insects. With most classes, the functions of their winged state are so much the most important, that we scarcely notice their previous states of existence; while in others, and the moth from the silk-worm is one, life in the winged state lasts but a few days, and its only purpose is the reproduction of the kind.

The eggs of the silk-worm will hatch in the natural temperature which usually follows soon after the putting forth of the leaves of the mulberry trees, which serve for its peculiar food. Unless checked by too cold a temperature, or by other unfavorable circumstances, and when supplied plentifully with their proper food, the worms increase rapidly in size. But as the skin does not grow with the general developement of the animal, the body, in a few days becomes too large for its covering. The worm then becomes sluggish, and its appetite is suspended; by a curious provision of nature, (common to many of the lower orders of animals,) the distended skin bursts open, and the before compressed worm comes forth, again to expand in growth, until the same process of release again becomes necessary. In this manner, four successive moultings, as they are called, are performed; that is, four distinct skins are cast off, in succession, as the worm out-grows them. The times of these moultings are surprisingly regular, under regular treatment, and like circumstances. And even with the greatest irregularity of treatment, not injurious to the health of the worms, these several moultings are are finished in from 25 to 35 days. The worm has then increased to forty times its first length, and to nine thousand times its first bulk and weight. It then ceases to eat; and, for the purpose of forming a protecting cover for is approaching dormant state of existence, it begins to spin, from the reservoirs in its own bowels, the beautiful and delicate yet strong silken thread, which is so highly prized by man, and for the sake of which, this feeble animal receives so much of his care. After having thrown out from its mouth enough scattered threads to fix its designed structure firmly to some support, in the chosen position, the worm begins and continues to spin, and to encircle itself with, one unbroken filament, carried around its body, and placed in successive layers, as regularly as spools are filled by the most perfect machinery, until the supply of material is exhausted, and the little oval dormitory is complete and secure. The work is then finished. In its close cell, the last

skin and the outward form of the worm are both cast off, and the juices exuding from the body soon harden into a dark colored thin and close shell. This is the chrysalis state. The body is shortened, and contracted in size; and the form is as much changed, as the appearance in color and size. After a short time, the thin shell or skin of the chrysalis is also thrown off, and the insect opens a way through its silken dwelling, and comes forth a winged moth.

To many vulgar eyes and understandings, these several changes of the outward form of insects, are absolute transformations, or metamorphoses, as complete as any told of in fairy tales, and as unaccountable as if a magician, merely by words of incantation, or waving his wand, were to change a man to a beast, or a reptile. And to such persons, who do not know that such complete transformations are altogether impossible, these would appear less strange and incredible than will the true facts of the case. It has been ascertained, by delicate dissections and careful observation, that each one of the successive and various outer forms of the insect is but the cover and disguise of the next which is to appear. The several skins which the worm throws off and renews, without changing its figure, are probably produced by the mere solidifying of the juices exuding from the newly stripped body. But the very different and successive forms of maggot, chrysalis, and moth or fly, all exist at once, however faintly traced, in the semi-fluid pulp which fills the body of the animal. Thus, the form of the silk-worm-moth may not only be easily traced within the chrysalis, but also, though more faintly, in the latter stage of the previous form of larva, or worm.

It is a curious matter for consideration, that although the silk-worm is as certain to live and to thrive as any other animal, under the artificial treatment and proper care of man, yet, if without that care, in any known region, and under any natural circumstances which we can suppose to exist, that few could live even a month; and, if left to sustain themselves, and exposed to the inclemency of the weather, and to the attacks of their numerous and resistless enemies, that the whole of the feeble race would probably become extinct within the year. Of course, this absolute necessity for artificial nurture could not have always existed; for there must have been a time when man had not learned the value of silk, or the skill required for its culture. It may be presumed, that in the forty-six centuries, (as asserted by Chinese authors,) during which the silk-worm has been under the care of man, that like other long domesticated animals it has changed some of its original instincts and habits, and thereby has ceased to exercise any power to guard against disasters to which it is no longer exposed. It is alleged, indeed, and has been so stated in books, that silk-worms have been in part, and extensively, raised in their native country, China, on trees in the open air. But the general facts of the extent of this peculiar mode of silk-culture, have not been established by sufficient authority; and even if it were possible so to raise silk-worms, we should have no faith in the greater cheapness or profit of this method. Silk, of some kind, may be made from the cocoons of various kinds of caterpillars; and large wild silk-worms, as they have been called, exist in this country as well as in China; and high hopes were entertained in Virginia, 190 years ago, of the great profits to be derived from raising, in preference, this "natural Virginia silk-worm."* There are three kinds of wild silk-worms in China, as described in a memoir on the subject by the French jesuit missionary, D'Incarville; but it is certain that neither of these is like the domesticated insect, inasmuch as the latter feeds exclusively on the leaves of the mulberry tree, and the former are stated to reject this food, and severally, to eat the leaves of the oak, the ash, and the *fagara*, or Chinese pepper tree.

China is supposed to be the native country of the domesticated silk-worm. There are extant Chinese writings on this subject more than 4000 years old; and a compilation of extracts on silk-culture from Chinese books of very great antiquity, (compared to any such treatises produced in what we are fain to consider as the civilized world) has recently been translated into French, and thence into English, and published in this country.† From this very curious work it would seem that silk-worms have not changed materially, if at all, since the remote times of these writings, and that they were no more then than now, able to dispense with the tender care of man.

II. *The early progress of the culture and use of silk.*

Until the sixth century of our era, the production of silk was confined to China, and the Seres, a tribe driven by their more warlike foes from China to Bucharia, where they found refuge, and established this branch of their former industry. From the latter country silk stuffs were sent westward until they reached Rome, in small quantities, and burdened with enormous expenses of transportation, and of the intermediate profits of the Persian and other traders. Virgil, the earliest writer of the west who expressly mentions silk, describes it as "the soft wool which is combed from the trees of the Seres," by which, it would seem that its origin had been confounded with that of cotton. Notwithstanding its increasing use, for centuries afterwards the Romans were not much more correctly informed on this subject. The next notice of silk by any Roman author, is by Pliny the elder, who speaks of it as a product of the Greek isle, Ceos, and as being derived from caterpillars which fed on the leaves of the cypress, ash, and oak trees. These, of course, could not have been silk-worms. The price of silk was so great, that even two hundred years after Pliny, the stuffs sold for their weight in gold. It is recorded that as late as the reign of Aurelian, that sovereign of the world refused a robe of silk to his empress, on account of the high price. The costliness and great beauty of such apparel had, at a much earlier date, caused it to be counted among the most expensive and rare ornaments of women; and in the reign of Tiberius, the law required "that no man should dishonor himself by wearing silken garments." Heliogabalus was the first of the emperors who used silk robes; and his doing so was deemed an offence so great, as to be enumerated among

* See the curious old poem, or rather string of doggrel rhymes, on this subject, dated 1652, and re-published in the first volume of the Farmers' Register, p. 734.

† See extracts from this volume at pp. 228 and 353, vol. vi, of Farmers' Register.

the many atrocious and infamous crimes of that monster.

The use of this luxury continued however to increase among the Romans, until it was not only fully tolerated, but came to be considered a necessary of life to the rich and great; and it became a matter of public and national interest and policy, to be able to purchase silk free from the extortion of the Persians, the immediate suppliers, and who, moreover were often at war with the Roman empire. But all efforts for lessening the evil were vain, until accident produced results which all the power of the Roman government had not been able to approach. Two Nestorian monks, by the persecution of their christian brethren of other sects, had been driven from India, and took refuge in China. There they saw, with wonder, in common use, and at comparatively low prices, garments of a material which they had been accustomed to consider as almost sacred to the use of princes. They also observed the insects which produced the material for these rich stuffs, and learned the manner in which they were reared, and their precious spoils obtained. Rightly conjecturing that this information would be highly valued and well rewarded, they made the long and dangerous journey to Constantinople to impart it, and to sell their plan to the emperor Justinian. He encouraged their returning, to procure the eggs of the silk-worm. They did so; and by concealing the eggs in their hollow canes, they were enabled to elude the jealous scrutiny of the Chinese, and to carry safely their charge to Constantinople. The eggs were there hatched, and the worms reared to propagate their race; and mulberry trees were planted to secure in abundance their proper sustenance.

Justinian made a royal monopoly of this new and rich product. But after his death, the culture spread from the capital over Greece proper, which became devoted to mulberry and silk-culture, and continued for 400 years to enjoy the benefit of being the only European silk-producing country. Religious persecution had been the cause of bringing the industry from China to Greece; and war, which has served indirectly to confer so many great blessings, as well as, directly, to produce so much suffering to the human race, was next the means of extending the knowledge and the art of silk-culture to other regions. When Roger the Norman king of Sicily, invaded Greece, in 1146, and spread devastation and ruin over the Peloponesus, among the other spoils of his conquest, he carried off many captive Greeks, who, by his order, taught his Sicilian subjects to rear silk-worms, and to manufacture their products. The silk stuffs of Sicily soon became celebrated. Thence, in time, the culture was spread over Italy, which still is the only country in Europe where it is very extensively pursued. Still, all the discouragements produced by the rule of Turkish despotism and barbarism, have not prevented silk continuing to be one of the most important products of the country into which the culture was first introduced and established by the policy of Justinian.

The attempts to establish silk-culture in the more western parts of Europe have been far less successful. The cause of difference, is to be found in the difference of climate; the eastern, or more distant from the ocean, having much greater extremes of heat and cold, or hotter summers and colder winters, in the same latitudes. And this *defect* of temperature, as it has been commonly considered, (or wide extremes,) in the following argument, will be maintained to be an important *advantage* for silk-culture; an advantage which Greece possesses over Italy, and Italy over the south of France; and, as it may be inferred, for similar reasons, our own country over the silk producing regions of all Europe. But to return.

III. *The climate of France, and western Europe in general, unfavorable to silk-culture.*

Silk-worms and mulberry trees were first introduced in France in 1450, by Louis XI; and in 30 years silk stuffs appeared amoug the fabrics of Lyons and Tours. Subsequently, both the culture and the manufacture of silk were zealously encouraged by the government, especially under the reigns of Charles VIII, Henry IV, and Louis XIV. The manufacture has flourished. But in all the longer intervals between the different times of greatest effort to promote its growth, the culture and production of silk languished; and indeed it would seem that it is only since the general peace, in 1815, that France promises to derive any considerable portion of her great agricultural income from the production of silk. This opinion as to the second greatest silk producing country of Europe may probably be considered altogether unfounded and untenable. But it seems to be sustained by the general and direct statements of the latest French work which we have seen, (Morin's '*Manuel.*') After speaking of the previous times of depression which had occurred between the shorter periods of prosperity caused by particular encouragement during the few detached reigns just named, the author adds, that "under Louis XV, and Louis XIV, and still more during the first years of the revolution, silk-culture was struck with discouragement. Under the empire, it was barely not forgotten among the other manufactures. But since the restoration [1815] the establishments in which silk-worms are raised and the culture of silk prosecuted, have taken a consistency and growth much more considerable than had existed for a long time previously."

If a judgment may be formed from the testimony of Arthur Young, in his voluminous and interesting and valuable report of the agricultural practices and products of France,* the opinion above stated is greatly confirmed. His travels and personal observations were made immediately before, and during the early part of the revolution, and just at the close of the longest period of internal tranquillity and of general prosperity that France had ever enjoyed. And yet at that time, the mulberry plantations must have been very few, even in the southern part of the kingdom, to which they were almost confined, and the business of silk-culture far from profitable. This deduction is unavoidable from all the statements in Young's chapter "on the silk-culture of France," which was copied in the preceding pages of this number, (see p. 135 to 140.) In addition to these very full statements, the following will be quoted from his chapter on "climate." After having stated many particular examples of the severe ef-

* Travels in France during 1787, 8, 9, by Arthur Young.

fects of late frosts on other vegetation, and through the country in general, he adds—"perhaps it may arise from the late frosts in the springs, that we meet with so few mulberries in France north of the *olive district*. The profit of that tree is very great; yet the districts where they are found in France are very inconsiderable, compared with the extent of the whole kingdom." In a previous passage, (and in his map,) he had divided France, in regard to climate and vegetation, into three regions, described in his own words, as "1st, the northern, where vines are not planted; 2d, the central, in which maize (or Indian corn,) is not planted; 3rd, the south, in which *olives, mulberries, vines and maize*, are all found." He afterwards marks the northern boundary of this *olive district*, (without the limits of which "so few mulberry trees were met with,") by a line drawn through Montelimart and Carcassonne, which leaves on the Mediterranean, for the whole "olive district," not more than one-twelfth part of the area of France. And a third of even this small district must be much colder than the rest, and therefore unsuitable, as one extremity rises into the Italian Alps, and the other into the Pyrenees. Malte-Brun seems to limit the silk producing region to still less space. This author gives but the following scant notice of the silk-worms of France, when enumerating the insects which are among the valuable and productive animals of that kingdom: "The silk-worm, habituated to the climate since the time that Louis XI. planted the mulberry tree, forms by its products *part of the riches of Dauphiny*. The weight of raw silk thus obtained in French manufactories, is equal to 5,200,000 killogrammes." [*Universal Geography, France, book* 141.] The ancient province of Dauphiny comprehended the territory in the south-east, which is now divided into the three departments of High Alps, Drom, and Isere; and to this small space, the words of Malte-Brun would seem to limit silk-culture, considered as either a principal, important, or very valuable employment of industry in France.

In another part of the same chapter of Young, are the followwing passages. "Mulberries might in France be an object of far greater importance than they are at present, and yet the spring frosts are fatal impediments to their culture."—"Tours is the only place north of the maize climate where they are cultivated for silk with any success." To this testimony of the author of the very small proportion of the kingdom in which mulberry trees were raised, there may be added the facts that raw silk to the value of nearly 30 millions of livres was imported to supply the manufactures of France in 1784, and almost as much the next year.

These views of the comparative unfriendliness of the climate of France, and even that of the portions of that country most favorable to silk-culture, are very different from the opinions which have prevailed among us; and which have had, and still have, an unfavorable effect here, by their carrying with them the admission that the climate of the south of France is better than ours for silk-culture. Those persons, here, who are the least acquainted with the true condition and disadvantages of silk-culture in France, set out with the the discouraging admission, that the culture here must be necessarily less successful, because of the supposed great and superior advantages of the milder climate of France; and that, do what we may, our products and profits cannot compare with those of France. The better informed, who know the defects of French silk-culture, but who have not the less admitted its superior natural advantages, would thence necessarily infer still worse prospects, and profits altogether insufficient, for that industry in this country. Thus, to almost all persons, the supposed condition, whether advantageous or otherwise, of silk-culture in France, the silk country of which we know most, operated as a stumbling-block in the way of all efforts in the United States. This being the case, it is proper that we should more fully discuss this branch of the subject, and endeavor to remove the difficulty, by refuting the position which has so long and so greatly served to discourage effort here.

Among the best informed persons who have taken this mistaken view, we will cite a writer in the 4th volume of the Farmers' Register, whose agricultural opinions are always worth hearing, and who always, even when in error, (which has been rarely the case,) maintains his ground most ably.* His argument is as follows:

"The culture of silk was a favorite object of attention in Virginia, Georgia, and other parts of our country, at a very early period. The project seems to have been lost sight of for very many years, until lately, when it has been revived with increased ardor, to the north as well as the south, and has occupied no inconsiderable space in your columns. In the numerous publications on the subject that I have looked over, I do not remember to have met with one word of discourgement. I should not feel disposed, were it in my power, to discourage it altogether; but all will agree, that the difficulties attending it, if any, should be fairly stated, and that those who engage in it, should be enable to act "*understandingly*."

"Having paid some attention to this matter, I will give you the result of my inquiries, and certainly have no wish that my opinions should pass for more than they may be found to be worth.

"From all that I have been able to learn, the silk-culture has never been carried on extensively and with success in climates where the cold of winter is long or severe, or in countries that are not well peopled. In China, the breeding of silk-worms, and the manufacture of silk, have been carried on for thousands of years, and at this time, employ a considerable part of the crowded population of that immense empire. It has long since been observed, and I believe, is undoubtedly true, that no two distinct countries, in the same parallels of latitude, resemble each other more in climate, than China and the United States. In turning over the pages of Staunton, Barrow, and other travellers in China, I was struck with the circumstance, that in going from north to south. they did not find the cotton plant an object of cultivation, till they came to about latitude 38, and then only on a small scale, till they had gone some distance further south; showing a striking coincidence, in this respect, between that climate and ours. The culture of silk, does not seem to have extended so far to the north, by several degrees of latitude. In

* This correspondent was John Wickham, esq. The recent death of this powerful reasoner and enlightened agriculturist, permits his being now here named without impropriety.

France, from all I can learn, and I have taken some pains in the inquiry, it is not extended further north than the banks of the Loire, though it has been attempted in Normandy, and other more northern parts of that country. In Italy, it is carried on as well in the entensive valley of the Po, as south of the Appenines; but this fertile region is fenced from wintry blasts by the lofty ramparts of the Alps, for its whole length from east to west, and its climate is much more temperate in winter than ours, and the length of summer greater.

"If a mild temperature were the only requisite to preserve the life of the worm, this object might be attained by artificial means; and, with due attention, the proper warmth of the apartment in which they were hatched, might be maintained through the cold season, at the proper point, though not without much care and cost; but the worm cannot exist without food as well as warmth, and a constant supply of green leaves is absolutely necessary for its sustenance. Although attemps have been made to substitute other vegetables, I believe none have been found to succeed on a large scale, but the mulberry, some varieties of which are said to be much preferable to others. The mulberry being a deciduous tree, can afford no supply of food during the cold season, as indeed is the case with all other trees or plants, that have been recommended as substitutes. It is true, that the insect, while in the egg, or in the chrysalis state, does not consume any; and it may be possible to preserve the eggs unhatched during the winter in a northern climate, and indeed, it must be so to a certain degree, or the culture of silk would fail entirely in Connecticut. But on the other hand, its want of success in a sufficient degree to make it an object in the south of Germany, the climate of which is not much colder than ours—in England, where it is milder, and this with the advantage of direct encouragement from the public authorities, by high premiums, &c. and in the more northern part of France, while it succeeds further south—leads to a strong, I may say a necessary presumption, that silk cannot be produced as a general object of cultivation in the northern states, or even so far north as Virginia. You will readily suppose that these views are not original. If they were, their value would be less. They are the result of information that I have collected from various respectable sources, and among others, from Young's 'Travels in France,' a work of great and acknowledged merit, which is probably in your possession, or within your reach. If not, you may find it reprinted in Pinkerton's Voyages, &c. In chapter 23d, "*Of the culture of silk in France*," Pinkerton, vol. 4, p. 569 to 580, are notes on the cultivation of silk in different localities, generally in the south of France. The whole might take up too much space in your Register, but if you can find room for the passage on "*Normandy*," in pages 571, 572, and for the latter part of the chapter beginning at page 577, "*Languedoc*," &c. both you and your readers will find a detail of it in facts, I doubt not, an accurate one, relating to this question, and a course of clear and forcible argument that will deserve your consideration, and I think, satisfy you, that silk can never become an object of general cultivation. For myself, I am fully persuaded, that it would never answer on a large scale in our climate, even if the wages of labor were not so high as they now are, or are likely to be, for generations to come."

The copy of 'Young's Travels,' in our possession, is the first edition, 2 vols. 8 vo., printed in Dublin, and is certainly entire. Yet there is no such chapter as that above referred to; and it is only very recently that we have been enabled to find, in the 2nd edition, 4to, in the state library, and probably the only copy in Virginia, that there *is* this chapter on silk-culture therein, and also several others, which are not in the earlier edition. Not supposing that there could be so strange and unaccountable a defect in the only edition then known, we had inferred that our correspondent, well-informed as he was, had mistaken for Young's, some other article in Pinkerton's compilation, by a different author. Nor could we find that compilation, until very recently. The chapter which has at last been found, has been re-published in the foregoing pages, as introductory to this article. It was by a previous publication of opinion from the pen of this same able writer whose views we have just presented, on the climate of the United States, (see pp. 599 to 604, vol. iv, Far. Reg.) that we were first forcibly impressed with the fact of the remarkable similarity between the climate of China and that of the United States; and the difference of both from the climate of the western coast of Europe and the western coast of America, in the same latitudes, or even where the mean temperature was nearly equal. But from the same premises, in which we acknowledge him as our instructer, we arrive at a very different conclusions from this writer, as to silk-culture in this country. For while showing it to be conducted under great disadvantages in France, he infers that of course it must be much worse in this country; and on the other hand, from the difference of climate, we derive hope, and indeed assurance, of success here, from the very facts of these disadvantages of France. The grounds of this conclusion will be next presented.

IV. *The points of resemblance in climate between China and the United States, and of the difference of both from that of western Europe. The circumstances which make a climate favorable or adverse to silk-culture.*

It is true that the mean temperature of Europe is considerable higher than in the same latitudes in the United States; and in the different latitudes where the mean temperature is nearly the same on these opposite sides of the Atlantic, that the European temperatare is more equable and mild and the extremes of heat and cold much nearer than in the United States. Hence, the warmer parts of Europe, as Italy and the south of France, are more delightful to the feelings, and less hazardous to health, (under like circumstances in other respects,) than any region of this country, where the extremes of heat and cold are so much greater. This region of the most delightful climate of Europe, has also been that in which the silk-culture of Christendom is exclusively carried on with the greatest improvements of art, and with the most profitable returns; and the opinion has thence been derived, which has passed without denial or even doubt, that the warm and mild regions of Europe had the best climate for silk-culture; and that the best climate for that purpose in the United States, must be far less favorable, because more variable, and more cold. It is this opinion which I confidently oppose as erroneous;

and which, if not corrected, must continue to operate as the most powerful discouragement to effort here. But, if it be true, and admitted, that we actually have a better silk-climate than any part of Europe, then new and also the strongest inducements will be held out to our countrymen to compete with Europe in a contest in which nature is our ally.

Great as are the transitions, and remote as are the extremes of temperature, felt every year in Virginia, and however unfavorable they may be to our comfort, or even to health, they are not of the kind to affect silk-culture injuriously to half the extent that is done by the smaller variations of the milder climate of Europe. This seeming contradiction will be explained. When winter has once set in, and vegetation is thereby made dormant, no degree of cold known in Virginia is sufficient to damage the most tender of the mulberry tribe. And, indeed, the severity of the colder spells serves as a safe-guard against the trees (stimulated as they would be by continued warm winter weather,) putting forth leaves with the first impulse of spring, and thereby incurring great risk of the too forward leaves being nipped by late spring frosts. This danger, as has been shown on the authority of Young, and as may be gathered from every French work on silk-culture, is very great in the milder and more temperate climate of France; and it may be inferred, from the operation of like causes, that the same danger, though in a less degree, must also belong to the silk region of Italy. The vicinity of the greater part of all the silk region of these countries to either the Alps, the Pyrenees, on the Appenines, and the consequent frequent exposure to piercing cold winds coming from these snow-capped mountains, must much increase the danger of late spring, or summer frosts. On this account, after the leaves of the mulberry trees have started, and still more after the silk-worm eggs have been hatched, a sudden depression of temperature, though but of 20 degrees, yet if serving to cause frost, might be destructive to the crop; when a variation of 40 degrees in this country would, in comparison, be harmless. The important difference in the two different climates is this. Moderate as may be the variations in Europe, the range of the thermometer will often be found from enough *above* the freezing point to urge vegetation to put forth, to as much *below* it as will serve to kill the vegetation so produced. Here, with far greater variations and extremes of temperature, our mildest winter weather is too cold, or the warm spells of too short duration, to permit the mulberry leaves to spring prematurely; and in latter, spring and summer, there is no weather cold enough to hurt them. The winter transitions here are between moderately and excessively cold weather; those of summer, from moderately to excessively warm. But the mean temperature of the cold season is low enough to keep vegetative life suspended, and therefore safe; and the temperature of the warm season is always high enough for the safety of the mulberry leaves after they have opened and begun to grow. It will be readily perceived that the very great and sudden and unpleasant fluctuations of temperature, which constitute the great and acknowledged defect of the climate of Virginia, are not incompatible with enough of steady cold weather in winter, and steady warm weather in summer, to make a far better silk-climate than that of a country the most blessed in mild and regular temperature. There is not sufficient distinction usually drawn between a climate being considered warm for its winter or its summer temperature. The south of France bears in safety the pomegranate, the olive, and the orange, none of which can grow in open culture, in Virginia; and hence it would be supposed that the former region is much the warmer. But it is the mildness of the winters, which prevents their being killed by intense cold, and not the greater or more regular heat of the summers, that sustains the life of those trees. And it is not warm winters, but the reverse, if connected with warm summers, which are required for the greatest success of mulberry and silk-culture.

A strong support to the position just stated is presented in an account of the causes of failure of the silk crop in the department of Gard, which reaches to the Mediteranean, and is in the south-eastern part of Languedoc, and in the warmest and best silk region of France. This article is in a French periodical, and though long in our possession, had not been read, or supposed applicable and useful here, until this essay had been written. A translation of the article will succeed this; and the reader will there find fully displayed the disadvantages of warm weather in winter, as well as of cold weather in spring and summer afterwards. Admit to the full extent the intelligent author's proposition, that the unusual warmth to which the eggs were exposed in winter injured the vitality and health of the worms, and that the late frosts cut off the supply of food from the too early hatched worms—and still there remains a manifest remote or *earlier cause* of these immediate causes of failure, viz: the warm weather of winter having stimulated and forwarded the vegetation of the mulberry trees, so as to expose the leaves to be killed by the late spring frosts afterwards. A much colder winter would have greatly protected the trees, by keeping vegetation inactive, even if it had not entirely prevented the evils of the temperature of the succeeding spring. And both a cold winter and a hot spring and summer, (or the usual degrees and variations of temperature in Virginia,) would have been a certain safe-guard against all the losses which occurred in this, the warmest part of France.

The vigorous growth of the most valuable of all grains, Indian corn, may serve as an indication of the summer climate most favorable to silk-worms. This plant requires much heat of summer, and of sufficient duration to perfect its growth, and is not affected by the intense cold which may reign in winter. And it will neither flourish nor ripen in a climate of much more elevated mean temperature, but of which the heat of summer and the cold of winter are less remote. Thus, while this grain grows in the highest vigor and luxuriance, not only in the longer summers of Virginia, but under the very rigorous climate of New England, and even in Canada, where the winter lasts nearly half the year, yet in Europe it is no where so productive, not even in the olive region; and cannot be raised to profit where the mean temperature is much warmer than that of Virginia. Our cold winters are merely not hurtful to the culture and product of Indian corn; but for mulberry and silk-culture they are decidedly and greatly advan-

tageous. By artificial cold, we may guard the eggs of silk-worms from hatching too soon for the full supply of food; but it is only a natural climate of sufficient rigor in winter that will keep back the springing of the mulberry leaves, long enough to avoid such spring frosts as are common in the south of France, and even in Lombardy. From these different causes, it follows that the destruction of mulberry leaves by late frosts, which is a calamity so frequent in those delightful and warm climates, will be of very rare occurrence in Virginia. And, to extend the ground of remark, it may be safely inferred from the several positions assumed, (if they are considered as maintained,) that in no part of the United States is the rigor of winter any obstacle to silk-culture, unless the mulberry trees (while vegetation is dormant) are killed or injured by the cold; nor the long duration of winter weather, except so far as shortening the time for growth, and lessening the summer's product, of the mulberry leaves. Neither is it supposed that in the most southern states any important obstacles of opposite character will operate; for though the mild winters there will hasten vegetation, steady warm weather succeeds as early in proportion; and the summer is there long enough to raise several successive crops of worms, and yet pretermit the time of excessive heat which would be injurious to their health.

There is another view of this part of the subject which deserves more consideration than the incidental notice taken of it above. The remarkable differences of temperature in the same latitudes, which are found to exist on the opposite coasts of the Atlantic, are also found on the opposite sides of the Pacific ocean. Thus the eastern coasts, both of North America and of Asia, are much colder, in mean temperature, than the western coasts of both continents in the same latitudes. This is not the place to discuss the causes; but the effects are known to be as just stated.* Hence, it might be inferred, in the absence of facts for evidence, that the climate of the United States, both in mean temperature and in extremes, is much more like that of the same latitudes of China, which is similarly situated on the western side of an ocean, than either is to the climate of any part of Europe; and this position is also sustained by unquestionable facts. This conclusion then, to which we came both by way of reasoning and experience, furnishes additional strength to my position, that the climate of Virginia is better for silk-culture than the best in Europe. For in China, though with less advantage of the improvements of art or science, the business is undoubtedly conducted with more success than in any part of Europe; and therefore, as well as for the other reasons stated, it will scarcely be doubted that the climate of China is among the best for this purpose.

The cold of winter is no injury to the growth and product of mulberry trees, unless it is so severe as to kill their branches; and that is not to be feared in Virginia, even for the most tender kind, nor indeed much farther north. On the contrary, a considerable degree of cold in winter is beneficial, by preserving the dormant condition of the trees, and preventing the too early putting forth of the leaves, and their consequent exposure to the spring frosts, which are so often fatal in the south of France, and even in Lombardy, after winters so mild as not to endanger the growth of the olive and the orange tree.

Neither does the severest cold of our winters affect injuriously, in any way, the eggs of the silk-worms, or the labors and products of the worms. Experience has satisfactorily proved that exposure to cold much below the freezing point, does not affect the vitality of the eggs; and if necessary, it is easy to guard them from severe cold weather. But there is a decided advantage in their being kept at a low temperature through winter, whether natural or artificial, as it retards their hatching in spring until there is no danger of frost, or of deficiency of mulberry leaves, their only suitable food.

Thus our cold winters are either beneficial or harmless to both mulberry trees and to silk-worms; and it is unnecessary to bring proofs that our warm summers are better for both, than the cooler temperature of the summer of Europe.

Another well known difference of climate between this country and western Europe, is the greater dryness of the air here; and a moist atmosphere is even more injurious to silk-worms than exposure to too great a degree of cold. This ground of superiority cannot be disputed; but we are not competent to estimate the amount of its value.* The moisture of the air of England and Ireland, more than the low temperature, has made to fail the efforts there at silk-culture.

It is the proximity of the Atlantic ocean, and the prevalence of winds charged with its vapors, that cause the greater moisture of the atmosphere of the western countries of Europe. And it is the more equable temperature of the ocean, communicated to the winds sweeping over its surface, which serves to moderate and prevent extremes both of heat and cold in those countries. For this reason, as we advance eastward in Europe, from the Atlantic towards Asia, though keeping on the same degree of latitude, it will be found that the places successively reached are more and more adapted to silk-culture, just in proportion as the extremes of temperature become greater.

Arthur Young's practical observations on the climate of France and Italy, and the regions of different vegetable cultures, as marked in his map of the former country, serve admirably to sustain these views; although he does not seem to have reasoned thus from his own observations and facts. His division of France into the three agricultural regions described above, was not made according to any theory, or philosophical speculation, but by his observing and noting, with the practised eye of a farmer, in travelling across the kingdom repeatedly, and in various routes, the places where each kind of culture began, flourished, diminished, and finally ceased. Thus, the region over which

* See this subject treated in an 'Essay on the Climate of the United States,' which was reviewed at page 599, vol. iv, Farmers' Register. This essay, which was first published thirty years ago, was written by the late John Wickham, esq.

* G. B. Smith, esq., than whom there is no better authority on this subject, in his remarks in the Baltimore silk convention, (published since this piece was written,) attaches so much importance to the greater dryness of the air of this country, that he deems that alone sufficient to give to silk-culture here superior profits over that of Europe. See p. 83, vol. vii, F. R.

mulberries were *generally* cultivated, (not regarding exceptions to the general rule,) showed to him where silk was deemed profitable; where wine was a common product, showed the region in which the vine flourished; and where neither of these were common, he inferred that the climate forbade them both. According to such observations, he has drawn straight lines across the map of France, separating what he calls the southern, central, and northern regions. But instead of these lines running, as perhaps would be supposed by most persons, nearly from west to east, their average direction is about north-eastward. Thus, the line drawn to show the northern boundary of the olive and mulberry region, though but short, has its eastern extremity more than 2½ degrees of latitude more to the north than its western extremity.

For these reasons also, principally, if not entirely, the climate of Piedmont and Lombardy is very far better than that of the ancient provinces of Dauphiny and Provence, in France, lying immediately westward, and within the same parallels of latitude; and proceeding still farther westward, towards the ocean, Gascony, though more to the south than Piedmont, is found without the northern boundary of silk-culture, and unfit for that industry, as was then supposed by its cultivators.

Since Young wrote, great and valuable improvements in silk-culture have been made, by Dandolo and Bonafous in Italy, Camille-Beauvais, Carrier, and others in France, by which, and especially by substituting artificial for natural temperature, the business has been successfully extended into regions formerly deemed much too cold and adverse. But though we highly appreciate these discoveries and labors, and have great confidence in the superior profit of the artificial system, still it is not this improved condition of silk-culture that shows the *natural* fitness of climate. It is therefore that the limits of the silk region, and the profits of the culture, as considered fifty years ago, furnish a far more correct indication of climate, than the greatly improved and still improving labors of the present time.

If it is indeed true that the climate of the United States is superior to that of southern Europe for silk-culture, then there need be no difficulty in admitting the fact, which so many different persons have asserted, that *the silk produced in this country is decidedly superior in quality to that imported from Europe.* Arthur Young reports that the French silk then manufactured at Lyons, was lower in price by one-third, on account of its inferior quality, to the raw silk imported, (mostly from Italy it may be presumed,)* and if such a vast difference be caused there by climate, we may well attribute to that cause the admitted superiority of the small quantity of silk produced in the United States; and believe that the effect, like the cause, will be *permanent.*

V. *Early attempts at silk-culture in Virginia, and causes of their failure.*

We will now go back to the earliest attempts to introduce silk-culture into Virginia, and show the causes which induced the efforts, and those which brought total disappointment and failure.

It was to the favorable opinion of silk-culture held by James I. of England, and his urgent recommendation, that was owing the earliest legislation in Virginia for its encouragement, and the commencement of that policy which was adopted so early by the colonial legislature, and adhered to so long with no good effect.*

The earliest legislation by the house of burgesses, or representatives chosen by the people of Virginia, was in 1621, fifteen years only after the first landing at Jamestown; and two of the acts of this first assembly were designed to maintain the policy of encouraging silk-culture, which still earlier had been urged on the colony by the advice and instructions of the king. One of these acts required that the native mulberry trees should be preserved, when cutting down the other forest growth for cultivation; and the object of the other was to induce and compel the planting of others, for feeding silk-worms. These, with the many subsequent enactments for this purpose, or on this subject, have been recently republished, or the purport stated, in the last volume of the Farmer's Register, to which the curious reader is referred, for the details.† It is enough to say here, that for half a century it continued to be the policy of the colonial assembly, and the frequent subject of legislation, to compel the planting of mulberry trees, and to encourage the growth of silk.

But all these many and long continued efforts were fruitless. Silk never became a notable product of the colony, nor have we any account of its having been exported in the smallest quantity, save the tradition that Charles II. had worn a robe of Virginian silk. The planting of the white mulberry tree however, had been very generally extended. One individual had 70,000 trees growing, for which he claimed and received the bounty previously offered by the colonial government. But still no silk appears to have been made, at least not in quantity sufficient to be noted as a commodity of trade; and the only evidence of the encouragement so long offered for this branch of industry, which now remains visible, is presented by the numerous white mulberry trees, the progeny of the parent stock formerly brought from Europe, and which are thickly set, and growing like native plants, on all the uncultivated spots (and especially where the soil is calcareous,) of the banks of James and York rivers.

This total failure of efforts so long and steadily persevered in by government, may seem at first view as showing conclusively that Virginia is altogether unfit for profitable silk-culture, and that the many efforts just now commencing by private individuals, will have no better results. This conclusion would be incorrectly deduced; and it is important to the well and vigorously conducting of this new branch of industry, and to the interests of Virginia, therein involved, that correct

* See last article of this No., page 139.

* The great partiality of James for silken apparel, and its great scarcity and high price, are exemplified in an amusing anecdote of this monarch. While he was king of Scotland only, and being about to admit to a first audience the English ambassador, he wrote a letter (which is still preserved) to his subject the Earl of Mar, to request the loan of a pair of silk stockings for the occasion; "for" he adds, to enforce his request, "you would not, sure, that your king should appear like a scrub before strangers."

† See notices on extracts of the oldest laws of Virginia in regard to silk-culture, at pp. 621, 712, 714, 716, 717, of vol. vi, Farmers' Register.

views should be entertained as to the great difference of circumstances, formerly and now, by which, measures which are urgently invited at this time, by inducements stronger than any former legislative control or bounty, (however beneficial such aid might be) were then forbidden, or rendered inoperative, by obstacles still stronger.

Since the modern improvements in managing silk-worms by artificial and regulated temperature and ventilation have been made known, it may be pronounced that every climate is sufficiently friendly to the growth and health of silk-worms, provided their peculiar food can be produced plentifully and cheaply enough. The question is no longer, whether the natural temperature of the climate is mild and warm enough for the health of the silk-worm; but whether the soil and climate are highly favorable to the growth and regular supply of leaves of the mulberry tree, and that land for the growth, and labor to gather the leaves and to tend the silk-worms, can be also afforded cheaply. Even as to the natural climate and weather, without resorting to the easily available artificial safeguards against inclement spells, there are few regions better suited to the wants of the silk-worm, than all of the lower and central parts of Virginia; and better suited is our climate than that of any of the more northern states, and very far more so than in Connecticut, where silk has been successfully raised and manufactured, in families, for more than 60 years, without the benefit of artificial temperature, or any other of the new and great improvements in the culture and management. All fears of the climate being unfavorable, then, may be dismissed from our minds. Of course, it was not any defect of climate that prevented the success of the government formerly in the attempts to establish silk-culture.

But there were much greater obstacles; and such as would have been insuperable, even if legislation for encouragement or compulsion, had been directed as wisely, as in fact it was unwisely.

It may be seen in many of the old laws that it was not more the care of the government to encourage the raising of silk, than of Indian corn, and other staple products, necessary for the food of the cultivators themselves. But for the stronger compulsion of the danger of starvation, the legislative encouragements to plant corn, and rear live-stock, would perhaps, have been of as little effect as the encouragment of silk-culture. During all those early times, and long afterwards, considerations of profit, or the prejudices formed by old habits, induced the colonists to cultivate tobacco for sale in preference to every other product of agriculture. This alone would have been more than sufficient to counteract all the ill-timed and ill-directed measures of government to induce the undertaking the new and untried production of silk. But besides this sufficient reason, the circumstances of the country in other respects were then as unpropitious to the successful prosecution of silk-culture, as they are now the reverse. These circumstances will be now briefly enumerated.

Besides mild and warm summers, (if artificial heat is not regularly employed,) and besides the abundant and regular supply of mulberry leaves, there are also several other conditions necessary for the successful production of silk, as a crop for market, and still more for exportation. These are, cheap land and cheap labor, and either a sure market at hand for the cocoons, or raw silk, or manufacturing establishments connected with the cultivation, to weave the material for exportation to remote markets. The slightest consideration will show at once that all of these necessary elements of successful culture were deficient during the whole time when it was so strongly urged by the laws alone. Labor was scarce, and greatly wanting for the demands of what were considered pursuits far more profitable than silk-raising. Land, it is true, cost almost nothing in money-prices; but to clear off its heavy forest growth, with very costly labor, made the real price of land very high; just, as now, an emigrant to the west may buy rich forest land for $2 the acre, and yet pay for it, in the cost of clearing and bringing into tillage, more than the price of the best and richest farms on James River. For the raw products of silk-culture there was no near or sure demand; and the condition of a young colony was altogether adverse to the establishments of filatures, and manufactories of silk fabrics. Therefore, it is not at all strange that the comparatively feeble aids and inducements offered by government were without effect.

VI. *The peculiar circumstances which now invite silk-culture in Virginia.*

Now let us consider the present condition of Virginia as calculated either to invite, or to discourage, new exertions to introduce the culture of silk, in addition to the climate, of which enough has been already said.

In the first place, is the production known by sufficient experience to be profitable any where in the United States? This question is satisfactorily answered in the affirmative, by the long continued labors of the many silk-culturists in the far worse climate of Connecticut, on lands far more dear than ours, and labor more valuable for other uses, than we have to furnish. Where a community of industrious and intelligent people have persevered for more than half a century in a certain direction of labor, without intermission, or doubt of the value of their returns, there can remain no question that their profits are not ideal.

If, then, silk-culture, can be successfully prosecuted under the inhospitable sky of New England, surely it can be done in Virginia much better, with facilities merely equal in other respects. But, in addition to the manifest superiority in climate, we possess in Virginia other great inducements to undertake the business, in the present depressed price of our lands, and the low cost of the labor of young or infirm slaves, who must be maintained at the same expense whether so employed, or idle and totally unproductive, as some such are on almost every farm in Virginia, and who yet could well discharge the light and easy labors of feeding and managing silk-worms. From this one source of labor, already fully paid for and supported, and now altogether profitless even when not totally idle, enough operatives might be drawn, in Virginia alone, to produce annually millions of dollars worth of silk. And there is another source from which nearly as much might be obtained—the many destitute but respectable white females, who either suffer from want, notwithstanding their daily and unceasing

toil, or live, as wretchedly, dependent on the cold charity of their friends. The winding or reeling of the silk from the cocoons would furnish much profitable employment for intelligent and skilful females; and some of the varied services of the cocoonry would suit even the most feeble physical or mental powers. Thus, besides the benefit of gain to private individuals, the introduction of this business is likely to aid greatly the public interest, and also the cause of benevolence.

The low price of lands in Virginia, caused principally by the mania for emigration to the west, is an enormous evil. But still, as the evil exists, and has wrought its worst injuries, it is right to estimate its value, and make the most of it, as an element of the necessary investment of a silk culturist. Land here, which though poor, is easily improveable and well adapted to the growth of mulberry trees, may be bought at from less than $2, to $5 per acre. At the north, land far less productive for that growth, and more difficult or costly to enrich, would perhaps cost $20 at least; and the European culturist could not be as well provided at a cost less than $200 the acre. Thus the landed part of the capital necessary to produce a certain quantity of mulberry leaves in Virginia, would be, (even at $5 the acre,) only one-fourth the amount of the same item of expense in the northern states, and one-fortieth of the same in Europe. Skilful and trustworthy superintendents would, of course, be more difficult to be obtained at first, and therefore, would cost more here; and experience, too, must always be paid for, by losses or otherwise, in every new business. Nevertheless, the peculiar advantages of Virginia are so great, that the combined expenses of the culture cannot be reasonably expected to be greater here for the first few years, nor as great thereafter. But this estimate rests upon the supposition that equal industry and economy are brought into operation. This is manifestly necessary in every business; and without proper industy and economy being used by us, our northern brethren will have greater advantage, from their usual and admirable exercise of these requisites for success in any business, than we shall find in our better climate and cheaper land and labor.

The kind of labor required for silk-culture is just such as every poor-house would furnish, more or less of, from those who are now altogether expensive and worthless paupers. It was with these views, added to the unusually good arrangements of the Petersburg poor-house, that we urged, in vain, on this community several years ago, the undertaking of silk-culture at that establishment. Though the time has passed for the measure to produce $30,000 clear gain, as the adoption of that recommendation then would have done, by profiting by the subsequent rage for buying Chinese mulberry plants, still, for the regular and fair returns of the business, the present time is much more propitious than the former, because there is more knowledge on the subject, and better means available. The magistracy of Petersburg could not adopt any measure at so little cost as this, which would redound so much to the credit and profit of their town, and to the benefit of their country at large.

Another very great advantage is enjoyed by the eastern part of Virginia, in the abundance and cheapness of marl; which advantage is also possessed by every other place where lime is easily available. Though the mulberry tree will grow profitably on very poor and mean land, still its most choice position is on highly calcareous soil. No careful observer can doubt as to this strong preference of the mulberry tribe for calcareous soil, and the more luxuriant growth thereon.

VII. *Benefits and facilities to be expected from the use of the morus multicaulis.*

But besides the advantages peculiar to Virginia, for prosecuting silk-culture, there is a most important one which is common to the union, and will ultimately be common to the whole silk-growing world. This is the possession of the newly discovered and probably but newly produced, variety of the mulberry tree, called morus multicaulis. It is not the high market value of this plant, in mere speculation and trade, that is here meant. *That* cannot last long; and indeed that factitious value will be reduced to *nothing*, and prove as empty as any other bubble blown up by speculation, unless the plants are put to their proper use. The real value of this variety for the better and more profitable feeding of silk-worms, will prove great to every culturist of silk; and this will be increased, instead of being diminished, with the necessary decline of the enormous speculative valuation and prices. The superior *real* or *feeding value* of this variety is founded upon the following several peculiar qualities:

1st. The remarkable facility of its propagation, and rapid growth, by which the young silk-culturist may begin to feed the worms in the first summer after planting, and have his trees in a highly productive state in the second season; whereas the leaves of the most approved of the other kinds, heretofere generally used, cannot be safely plucked before the trees are five years old.

2ndly. The greater ease of gathering the leaves, owing to their large size, and the small height of the trees from which they are plucked; which circumstances together serve to save more than three-fourths of this heaviest part of the labor.

3rdly. The more nutritious quality of the leaves, by which not only a less quantity will serve for the food of a given number of silk-worms, but also, owing to their more complete consumption, there will remain less of refuse matter to be removed.

4th. The superiority of the silk produced from leaves of this mulberry to those of any other kind, which has been satisfactorily proved by accurate experiments.

These superior advantages amount to so much value, that the use of this plant might well make silk-culture profitable in a country in which it would be otherwise a losing business. The people of this country, for some years to come, at least, will have almost the sole possession and use of this tree; and even when the older culturists of Europe shall slowly admit its superiority, and obtain its full use, still the advantages will not the less attend silk-culture in general, by their being more widely diffused. Though operating to far less extent and profit, still the effect of the general adoption and use of this tree by silk-culturists throughout the world, will be like a similar extension of Whitney's cotton gin to all cotton culturists; serving to benefit every one so much, and so much to extend the market for all, that the loss

of the advantage of its monopoly by one, could scarcely be perceived as estimated.

The first known plant of this variety, was brought to France from the Philippine islands, by Perottet, a French botanist. It has since been called the Chinese mulberry; and some of those who have attributed to it every possible virtue, and falsely as often as truly, have asserted that this is the kind in general use in China; and to this circumstance, they have ascribed the superiority of Chinese silk and silk-culture. But there can be no ground for this supposition; and it may well be doubted whether there is a single plant of this kind in the vast empire of China. It is a seedling variety, different from its own parent stock, and incapable of reproducing its own kind by its seeds. This being the case, its origin may as well be recent as ancient, and the plant which Perottet brought from the Philippines, and which, by its peculiar appearance, attracted his notice, without his reporting or probably suspecting its value, possibly, might have been the only individual then existing in the world. If, as has been asserted, this was the kind of mulberry tree in general use in China, it is impossible that its peculiar appearance, so different from any known in Europe, should not have attracted the attention of some missionary, or some other of the few, but intelligent and observant travellers who have had opportunities of passing through that great country, and who have published their observations. In addition, the compilation of extracts from Chinese works, before referred to, though describing several kinds of mulberry trees, does not speak of one which can be confounded with the morus multicaulis.

To conclude. If the facts, which have been stated, and the arguments founded on them, are both correct, then there can be but little ground for doubt or question of this important general deduction—that the combined advantages for silk-culture now possessed by Virginia, are superior to those of most of the successful silk-growing countries in the world, and inferior to few, if indeed to any.

ON THE CAUSES OF FAILURE OF THE CROP OF COCOONS, IN 1834, IN THE DEPARTMENT OF GARD.*

Translated for the Farmers' Register from the Annales de l'Agriculture Francaise.

The cocoons have generally failed this year in the *arrondissement* of Alais, (in Gard,) which furnishes a large quantity, and of the best quality; they have succeeded no better in the other parts of our department, and in the neighboring country. The deficiency of this crop is so much the more severely felt, in as much as it may be said to be the only one that brings us in any money.

The silk-culturists of Cevennes have great reputation, which they deserve by the labors they perform, and their attentions and watchfulness. But the greater number of them are opposed to any change of their routine; they all continue to do what they have always done, or seen done, although they are in different localities, and although the temperature varies from year to year. Thus the most skilful culturists fail sometimes. Either a laboratory badly situated, badly ventilated, the continuance of rain when leaves have not been provided in advance, or other causes, occasion diseases of the silk-worms, and may cause the failure of a particular stock. But this year, the evil has been general, and of course there must have been a common cause.

The *grasserie*, [*gras*] or *yellows*, prevailed generally in this region. Very few proprietors have been spared by this plague, which has occasioned enormous losses. Those culturists who have had half a crop of cocoons considered themselves fortunate.

Some persons attribute this disease to the [late] white frosts, which destroyed the leaves of the mulberry trees. They say that the second putting forth of leaves, called aftermath, is less suitable for the food of silk-worms. I cannot admit this explanation.

When the mulberry trees, stripped of their leaves in May and June, and the branches pruned or lopped the following months, shoot out a second time, it may well be supposed that this kind of aftermath is of inferior quality; that the tree exhausts itself by the leafing process, so forced by our industry; and that the sap is less elaborated, and in great part has exuded from the numerous wounds of the branches made by both the gatherers and pruners.

But when, at the commencement of spring, the frost affects the young buds, often it is but their outer envelopes which are blasted; and even if entirely killed, when the weather becomes mild, other buds come out in a few days. If other frosts still follow, as in this year, it is certainly a great evil; but it is more easy to nature, I believe, and costs less of vegetative force, to produce a new shoot at this season, than to again cover the tree with leaves after it has been stripped and pruned.

It is certain that after late frosts, the trees furnish fewer and smaller leaves, and that the total weight of those produced by a tree may be less by a third, or even by a half. But their constituent principles are the same with those spared by the frost. The water, the gum or resinous principle, the green fecula, the fibrous residue, are in the same proportions, in either case, if the trees are of the same kind, and in the same soil and exposure. The insoluble residue only is in smaller proportion in the young leaves.

I will add, to sustain my opinion, that some rearings of silk-worms upon the leaves called aftermath have succeeded, while some others made on leaves which had escaped the frosts, have failed. Every one has observed this, as well as myself.

It is my opinion that the ill success of the silk-worms was owing to the wintering of the eggs, and to the variations of the temperature during the hatching. I do not yet pronounce as to the sole cause of the disease (the yellows;) I propose to make, next year, some experiments to determine the point.

The yellows does not manifest itself but [illegible] until the third moulting; but the *gras*, which appears to have the principle of the other, appears from the begining of the feeding. And since

---

* The department of Gard is one among the most southern in the olive, or the best silk region of France. It extends to the Mediterranean, at the western mouth of the Rhone.—Ed. F. R.

this year, all the laboratories were affected, and at each moulting the evil increased, and this distemper reigned throughout, it must be, as I said before, that the cause must be common to the whole country. I find such a cause in the temperature which we have experienced, and of which I am about to submit some details.

The winter of 1833 '4 was warmer than any has been for many years, as is established by meteorological observations kept by my father from 1802, and since continued by myself. The thermometer rarely sunk as low as the freezing point,* [zero of cent. or 32 Fahr.]; and two mornings only, February 1st. and 2nd., the thermometer was at 5 below zero, [23 Fahr.] It rose many times as high as 14 and 15 degrees [28 and 29 Fahr.] in December, January, and February. We have had delightful and very hot days for days of winter.

The mean temperature of this season,	= +	9°. 98 cent.	[50 Fahr.]
The mean temperature of December,	= +	9°. 85	[50 F. nearly.]
" January,	= +	8°. 75	[48 Fahr.]
" February,	= +	8°. 80	[48 Fahr.]
" March,	= +	10°. 60	[51 Fahr.]

It has frozen three times in January, five times in February, three times in March, but slightly. The first freeze took place on January 21st. The lowest point of the thermometer in open air was + 3°, [37½ Fahr.] The thickest ice that I observed in the fields, February 1st, was only 10 millimetres [about half a line, or one 25th part of an inch,] in thickness.

Rains fell but five times in January and once in February; which produced but 71 millimetres of water, [27 hundredths of an inch.] In average years, there falls four times as much in winter.

There has fallen no snow on the plains; and the snow which covered Aigonal and Lozere this winter, and served to increase the coldness of the winds which pass over these mountains, remained on them for a shorter time than in common years.

The field labors, and vegetation, were advanced more than ordinarily. Some culturists, seeing the buds of the mulberry trees about to open, put the eggs to hatch fifteen days earlier than other years. Some worms had been hatched when, from the 16th to 23rd of March, severe white frosts killed the leaves in many cantons. It was necessary to throw away the worms, and to procure new eggs, which were very dear. The end of March and begining of April, were very fine and hot weather. Some persons had sought to retard the coming forth of the worms by putting the eggs in cool places; but others continued the process of hatching. The temperature was sufficient to produce the change of color and make the eggs hatch.

Cold again, from the 17th to 19th of April, arrested the hatching of the worms, destroyed the leaves which the first frosts had spared, and the buds of the trees which had [not] perished the month before.

But few leaves are wanting in the first age of the worms, even for a considerable stock for raising. Some few culturtsts saved their worms by means of some sheltered trees. The greater number threw away part of their stock, thinking, and rightly, that if there were fewer cocoons, their price would be higher, and that, towards tne close of the feeding, the leaves would be very scarce and dear. There were some proprietors who gave up this gathering entirely, to take care of their mulberry trees; and proceeded to prune them forthwith. These trees have well ripened, and are at this time very fine.

The diminution of the leaves was supposed to be fully a fourth, and yet there remained many upon the trees. In general, the crop of cocoons did not pay the expense of the leaves they consumed, although the cocoons sold for more by nearly half, than in average years.

All the culturists had observed that the eggs changed color from the second or third day, whilst, in common years, eight days are necessary. The winter, warmer than temperate, had prepared the eggs, and the first exposure to heat was enough to make them begin to hatch; but arrested at that time by cold, reanimated and benumbed anew, this alternation of life and death, if I may so express myself, was necessarily very prejudicial to the insects. The seed of a plant which should be moistened and dried many times, would perish finally; as would the eggs of a hen if set upon one day, suffered to cool the next, and so on by turns, heated and cooled. We may postpone the hatching of all eggs, and consequently of those of the silk-worm; but once commenced, it is necessary to keep up the warmth proper for hatching them.

In other years, we have been accustomed to take accounts of the laboratories which succeeded badly; but this year it was those which did not fail, which were remarked and cited. The most successful culturists were those whose eggs were wintered most carefully, who knew how to guard them from the early heats, used precaution in hatching them, in moving them and giving them air the most frequently; and those whose mulberry trees being less damaged by the frosts, could avoid protracting the feeding season.

CH. D'HAMBRER-FIRMAS,
Mayor of St. Hyppolyte-de- Caton, Member of the Agricultural Society of Gard, &c.

From the Farmers' Cabinet.

GRAFTING AND INOCULATING.

Grafting is a mode of propagating varieties of fruit of esteemed quality. Grafts may be cut at any time after the fall of the leaf in autumn, and before the buds begin to swell in the spring. They should be of the preceding year's growth, and are best from bearing trees and exterior limbs. They may be preserved by imbedding their larger ends in clay, a potato, or in moist earth, in a cellar in winter, or in the open ground, partially or wholly covered, in the spring. Grafts are frequently sent across the Atlantic. The great care should be, that they are not kept too warm or too moist, so that the buds swell before they are wanted for use. The rationale of grafting will suggest the time and the manner in which it should be done. The scion and graft are to be so adjusted that the sap-wood of the stock, by which the sap ascends from the roots, comes in contact with the

* In the original the degrees of temperature are marked according to the centigrade thermometer, which are here accompanied by the equivalents according to Fahrenheit.—ED. F. R.

sap-wood of the scion; and a like adjustment must be observed between the inner bark of both, through which the sap descends from the graft to the stock, after it has been elaborated in the leaves. Without the first precaution, the sap will not reach the graft, which will consequently shrivel and die. Without the last, the graft cannot knit or unite to the stock; for it is the descending sap which forms the new wood, and which indeed causes the graft to send its roots down into the earth, upon the outside of the wood, but under the bark of the stock. The union can only take place after the sap has begun to circulate in the stock, which is when the buds are bursting. The clay or composition is applied to exclude the drying influence of the air and sun, and also rain, from the wound, until a complete union has taken place. The graft does not become injured by being somewhat shrivelled before it is inserted; but if it appears too much so, it may be buried a few hours in moist earth before used. The compositions used as substitutes for clay are many. A good one is one part tallow, two parts beeswax, and four parts rosin, melted and incorporated like shoemaker's wax. If the weather is cold this will require to be softened by immersing it a time in warm water. A thin layer of this covering the end of the stock and the slit, will suffice. With the addition of a little more tallow, the composition may be spread upon linen or cotton cloth, when warm, and the cloth cut to the required size for a graft, and applied with less trouble in the form of a prepared plaster. The different processes of grafting are so generally known that we need not detail them; our object being only to throw out such suggestions as may tend to render the success of the operation more certain.

The following is the account of Mr. Robinson, of Portsmouth, N. H., of his method of performing the operation:

"Persons intending to graft or inoculate to good advantage, should in August procure their scions containing their buts and grafts. It is well to have for their better preservation, a portion of the larger limbs connected with them. If taken off immediately, they must be thrown, when bundled up and labelled, under the north side of your thick yard or garden fence, where they will be secure, if exposed to the influence of the atmosphere; having an eye in case of too warm and dry weather, they are not too much exposed. If so, just enter their but ends under the surface of the earth. This method is better than covering them up bodily, or keeping them in a cellar.

"Experience has taught me that there is a great advantage in procuring cuttings in this way, over the practice of neglecting till too late. I shall now attempt to show the best method to manage a nursery, as to securing good fruit in the most economical and speedy manner. To do this, grafting and inoculating is my text. The nursery is supposed to have been judiciously managed, and of one year's growth from the seed. Of course the plants are from one to two feet high, and as large as a Dutch quill; some much larger. All of this size never will be more fit to bud. There should be no delay. These little young trees have their peculiarly smooth and pliable bark; they are very thrifty, and consequently may be budded somewhat later than others of a different character. A nursery in this stage may be most advantageously budded. If the operation be skilful, they will take; and if otherwise, they receive no perceptible injury. The advantages of early budding are numerous and great. First, the job contemplated is over: you cannot have any uneasiness about it from any delays. Your trees are in a much better state for coming to perfection; they will thrive much better, notwithstanding they are cut off from two to four inches from the ground during the season; they will far out-grow the others in size and height, they also grow more erect and free from craggy twigs, a great saving in pruning. The improvement in their appearance is admirable. Picture to yourself trees from the nurseries such as I have received, and at full prices, with old stocks, half closed over, and budded two to three feet from the ground. The contrast is great.

"The disadvantage from suffering nurseries to remain till a number of years old, before budded, is obvious. The wound necessary for the bud, in thick and old bark, and especially if the bud *does take*, is of some injury. The cutting off the large old stock, leaving the bud alone while the stock is closed over—meantime the quantity of roots without a top in proportion, are great checks, and of much injury to the growth of the plant; and most ultimately affect the growth and health of the tree.

"I make these remarks from the authority of my own experience in inoculating a nursery in its different stages as above described.

"I shall now attempt to describe my process in budding. I was instructed to strike a horizontal cut through the bark, with a sharp knife, at a suitable place, on the north side of the stock; striking from this a perpendicular cut about an inch long, opening the bark with a knife or some instrument for the purpose; then taking a bud from the scion, having a care to take off a small portion of wood with the bud—then carefully taking away the wood, leaving the stem or eye of the bud whole and smooth—then thrusting in the bud with a due proportion of bark, three-fourths of an inch long, and half as wide. The bark of the but to be thrust in free from the bark of the stock above—then closing over the bark of the bud with that of the stock, binding it carefully, with elm or bass rind, or with coarse woollen yarn. This process has not yet proved perfect; it has with me often failed. I have sought for a more perfect and sure process. Accordingly I have varied, as my judgment has led me, for a better method. I have found that instead of striking a horizontal, it is best to cut quite a sloping stroke, splitting down from this slope perpendicularly so slow as to admit the bud, taking off in an oval shape, in the same careful manner as above described; having a care to preserve a little wood at the eye of the bud as I had in taking it away in the former process. The bud then is to be thrust under the raised bark, down so low as to admit the bark of the stock to come in its former place, above the bud, for half an inch, where it immediately receives its usual nourishment; being bound up with coarse woollen yarn, which I prefer to any thing else. In winding on the yarn, I am careful to draw it gently over the wound, omitting to cover the bud till the last, over which I then draw the yarn very softly. In this process, every part works so natural and so smooth, that if unbound the next day, it would be difficult

to distinguish the bud from a natural one; and indeed, the bud as well as the bark of the stock seems not in the least affected. In this mode of inoculating, there is no such thing as not taking. On the other hand, the bark being cut square across, and the bud not being sufficiently thrust down, the bark of the stock coming to bear on the outer bark of the bud, at the top of the slit, there is nothing to support it; but it dries and shrinks from its primitive place, admits air, and if the wood is taken out of the bud, it all fails together, especially if the eye of the bud is a little rubbed: at any rate, live or die, a dangerous wound is inflicted.

"The mode that I would recommend, is a safe and fast way of budding: it all works natural; a lad having his hand in, will put in from two to four hundred per day. I now proceed to give an account of inoculating in the spring of the year. This was an experiment, with me, altogether. In the season of grafting, I chose a few trees that were of common size for grafting; some had two good equal branches, one of which I grafted, the other I inoculated at the same time. I carefully cut out the bark of the branch where I chose to place a bud, cutting downward, turning my knife in and out in such a manner as to take off the bark in the form usually given in taking of the bud; taking at the same time so much of the wood, as to compare with the bud from the scion; and, if the first cut failed, I carefully mended my hand, until it well suited. Thus the bark being all well done, the bud was laid in, inside comparing with inside; of course a space was left on the edge of the bark of the stock not covered from its extra thickness on the old stock. The buds thus being left somewhat sunk in the stock, were then secured in the usual way of budding."

TREATMENT OF CATTLE.

From the Maine Farmer.

My experience demonstrates the fact, that where dry fodder is occasionally dealt out to neat cattle, they will drink from six to eight times per day, and I find by an examination of the stock through the country, that their good or bad condition is generally, if not invariably, in proportion to their facilities for obtaining water. Neat cattle are perhaps an exception from most animals, in their extreme nicity in partaking of their food and water, (hence the term neat). Their timidity in overcoming trifling obstacles to obtain water is no less observable. I have known them to endure thirst and cold with an apparent stoical indifference, rather than to make any attempt to pass over ice or snow drifts. I could name some persons in this vicinity who are considered good farmers, whose cattle every spring are like walking skeletons, living dead ones, mere shadows, not for any lack of good hay and comfortable barn room, but all for want of a convenient water fountain, that great restorative and corrector of dry fodder.

Before closing my hasty remarks, I would call your attention (If I am not out of place,) to one more error which I think many and even good farmers have fallen into with regard to a certain quality in a milch-cow, which they seem to think is all important in order to a good one: that is, that she should give milk until the time of her calving, and if she but possesses this quality it is to them a sufficient recommendation, if they wish to make sale of her, and that it is the great and only criterion by which to judge of a good or poor cow.

Now sir, so far as my experience goes, it is at variance with this argument, from the facts that cows that are milked to near the time of their calving, will not give so much nor so good milk during the year; as being milked at an unseasonable time, they loose much of their vigor and strength at a time when most needed—their bags do not have their natural fullness—their calves come weak and puny, and consequently are not worth so much, and that it is not possible by any subsequent keeping of the cow, to bring to a condition to give the same quantity and quality of milk, which she would have produced had she gone dry some two or three months.

With much respect,
I am yours, HENRY BUTMAN.

Dixmont, Feb. 18, 1839.

PROFIT OF IMPROVING POOR LAND.

To the Editor of the Farmers' Register.

Fairfax county, Va., Feb. 12th, 1839.

Dear sir—The first number of the 7th volume of the Farmers' Register, like the preceding volumes, has safely come to hand, and herewith you will receive a check for my subscription for the current volume of your most valuable Register. I also send you a memorandum from my *log*-book, not in any vain boasting spirit, because although the results therein stated are rather large for Virginia, and especially for Fairfax farming, still many of your readers north of Mason and Dixon's line, may be not a little amused at the self-complacency with which I send forth results, which, among them, would be deemed unworthy of record. But it is not the well, it is the sick, that need the physician. It is not the thorough practical farmer, whose highly improved lands already return him 50 or an 100 fold, who stands in need of advice or example to stimulate him to still greater exertions. But it is the great mass of Virginia farmers who, like myself, have poor and exhausted lands to operate on; lands which, in their present impoverished condition, are scarcely capable of supporting the labor necessary for their cultivation. Hence, in many instances, they are abandoned by the sons and daughters of the Old Dominion, who flee to the far west, in search of rich lands; which, to be sure they find, but with it, the yawning grave stands ready to receive the mortal remains of a moiety at least of emigrants; who, had they have displayed but half the energy, and have expended in *manures*, judiciously applied, less than a moiety of the cost of removing to the south or west, might have found themselves in possession of fruitful farms in the land of their fathers; surrounded by all the comforts and pleasures which flow from health and competency, and the enjoyments of society with which they had mingled from the hour of mirthful youth to the noonday of manhood. Is this mere fiction, a picture of fancy, or are such enjoyments real?

Are they not worth one small effort to secure them? for one I say they are real, and are worth an hundred times what they will cost to obtain them. I have tried it, and may now speak advisedly. The first steps toward it, are to cultivate *less* land and *do it better*, collect and apply at proper times, and in *due season*, all the manure that can be raked and scraped about the premises. If your land is deficient of calcareous matter, supply it either by the application of lime, marl, or bone-dust. Cost what it may, *it will repay you*, and with double interest, and although your means may not admit of your improving more than one single acre the first year, the increased products of that acre will enable you to improve two the second, and from those two you may improve (with the help of the first one) six the third year, and twelve or fifteen the fourth year, and so on progressively. For if it be true, that money makes money, so too, in a pre-eminent degree, does manure make manure, for there is no *usurious* law to limit the interest which the farmer may draw from his manure *bank*.

I was thirty years of age when I commenced farming, and I affirm that no regular farmer in Virginia ever commenced under such appalling circumstances as I did. In 1819 I found myself in possession of 140* acres of land, one half in wood, the other in hen-grass and deep gullies, without a pannel of fence or a building of any description on it, and without a *wheel-barrow* load of manure or any thing to make it of. 'Tis true, I was in the receipt of about $700 a year from another source; but what was that when compared with my wants? Houses to build, laborers to hire, feed and clothe, farm to stock, myself with somewhat extravagant habits to support, &c. &c.; in short, every thing to buy, and *nothing to sell!!* and what was worse than all, discouraged at every step by my neighbors, who, mostly affirmed, that Fairfax land could not be improved; and some went so far as to say, that clover and plaster would even impoverish it, whilst others declared that plaster-of-Paris would not act at all in *Fairfax*, to which my general reply was, "*I'll try it.*" I was adrift in the world, without any spot on the wide earth to which I could point as my *home*. I had to choose between the life of a wanderer, wasting my little income in hotels and boarding houses, or in struggling against the thick array of difficulties above enumerated, in endeavoring to build up for myself a home and a resting place in my own native land. I chose the latter, and I rejoice in the decision, and a kind providence has smiled upon my exertions, and spared me to enjoy the fruits of my labors, which have not altogether been lost, *(though often injudiciously applied) even on Fairfax land.* To what *extent* I have succeeded, it would not become me to say; suffice it that my farm on which I reside in the enjoyment of wife, children, and friends, has grown from 100 (for I sold 40 acres of the original wood lot, to get money to help along with) to 420 acres, including the 40 sold, which I have since bought back. The whole amply stocked with the choisest varieties of fruit-trees, all planted by *my own hands*. The arable land is in *good heart*, some of it upon which I have applied lime, only commenced with six years ago, is first-rate. Buildings* to the amount of ten thousand dollars have been erected, and of live-stock, and agricultural implements there is an abundant store. And next to the comfortable provision which I have thus made for the accommodation of my family, when I am no longer present to supply their wants, is the satisfaction of seeing the success of my experiment not altogether unheeded by my neighbors, who begin to think that Fairfax lands may be improved, though some are not yet quite sure that the experiment may not be a little like the Indian's gun, "cost more than it will come to." To such I would say, try it for yourselves, begin with a single acre if no more. Others there are among us who will not improve their land because their taxes would increase as the *intrinsic* value of the land is enhanced! This I assure you, is a weighty argument with some, especially with the tenantry, whose rents would also be increased if they should improve; and in the *total absence* of any legislative encouragement to the agriculturist, this rule of taxation has something the appearance of imposing a fine on a man *for improving his land!*†

THOS. AP C. JONES.

* This lot of 140 acres was designated in the division (by which it fell to me) of a large landed estate, by the commissioners, as lot No. 3, "Poor Hill."

Product of ten acres of land on the Sharon Farm, in Fairfax county, Va., improved by liming and manuring, for the year 1838.

Five acres of wheat produced 117 bushels, at $1. 60,	$ 187	20
Straw of the same,	28	25
Three acres produced *eleven tons* 16 cwt. of cured clover hay, worth on the farm 50c. per cwt.	130	00
Clover seed from the same ground, 2½ bush. worth now $15 00 per bush.	37	50
Rye—the straw from one-fourth of an acre,	12	00
Three-fourths of an acre in sugar-beets, ruta baga, carrots and turnips—not more than one-fifth of an average crop, in consequence of drought, but according to present prices worth $75 00,	75	00
Fruit and cider sold from peach and apple trees growing on the above land,	251	50
One acre of turnips, gross amount, as per statement No. 1, (below,)	255	20
Apples and cider and other fruits consumed at home, and what remains on hand at this time,	86	00
Five pigs raised in a pen, and fed on grass and offal fruit from the above ground, and kitchen slop, killed at ten months old, weighed 734 lbs. at 8 cents, is $58 72		
deduct two bbls. of corn for last feeding, 8 00		
50 72	50	72
	1,113	37

* It is not to be understood that these buildings have been erected, or the additions to my land been paid for *directly* out of the proceeds of the farm. But the farm affording me a living, has enabled me to apply other resources to these objects; which, without the farm, would have been exhausted in the *current support* of myself and family.

† The county assessor, acting under a law of the last session of the assembly, has added just 100 per cent. upon the value of my *land*; of course I shall have to pay double taxes; but I don't consider myself much the worse for it, seeing that my products have increased in a much greater ratio.

One thousand one hundred and thirteen dollars and thirty-seven cents, from which I leave the reader to make his own deduction for the year's expense of cultivation and marketing. This much I affirm, that no acre of the above land, except the one in turnips last year, has ever cost $15 to improve it, and that every acre has paid me from $25 to $50 annually since the lime and manure were applied; always doubling or *trebling* the cost of improvement the *first* year.

Dr. One acre of Fairfax land in acc't with The owner. Cr.

1838.				1838.			
	To saleable value of the land $8 00,	8	00		By 187 bushels of turnips, sold in Georgetown and Washington city, at an average of $1 10 per bush. is $205 70.	$ 205	70
	60 bushels of lime at 12½ per bush.	7	50		By 40 bush. consumed by the family,	44	00
No. 1	Paid for hauling the same 8 miles, 3 c. per bushel,	3	75		By 5 bush. reserved for seed,	5	50
	25 bush. bone manure,* bought in Roxbury, Mass. at 35c. per bush. $8 57					255	20
	Package, freight, hauling, spreading, &c. &c. 3 75				Present value of the land, say $50 00	50	00
	$12 50	12	50			305	20
	Ploughing, harrowing, rolling, hauling and spreading manure from farm-yard, turnip seed and after-culture, including three bushels of plaster-of-Paris	9	40		Per Contra,	53	15
	Cost of marketing the crop,	12	00			$ 252	05
		$ 53	15				

*This is my first improvement with bone manure; and it will be seen that it constitutes the heaviest item of expense in the above table; equal, and even greater results might have been secured by substituting manure made on the farm for the bone manure. The labor, and all other expenses, I have set down at the highest rates and cash prices, although performed by my own hands and teams, so that in fact, the lime and plaster constitute the only absolute cash expenditure to which the farmer is subjected in improving his land about here.

I have made various applications of the bone manure to grass and grain seeded last fall, and shall continue them through spring. If I am spared to see the results, they shall be communicated to you in due time.

Two hundred and fifty-two dollars and five cents, the net proceed of *one acre* of land in a single crop, in return for $23 75 laid out in *manure. The cash expended was not sixty days out of pocket.*

It is proper here to remark, that owing to the unprecedented drought, turnips were very scarce in market, and were consequently unusually high. From the same cause, however, my crop was not half of an average one in quantity. I have made in a very good season 600 bushels per acre, and 450 might be considered an average crop; which, at 37½ cents per bushel, a fair average price, form data by which the turnip crop in this vicinity may be correctly estimated.

THOS. AP C. JONES.

Sharon, near Prospect Hill, Fairfax Co. Va. Feb. 12th, 1839.

[It is seldom our usage to accompany the communications of correspondents with a commentary of encomium; and never merely for the purpose of paying personal compliments to the writers. However well deserved such praises may be, and much as our feelings may urge the expression of approbation of such articles, and of thanks for the service to our publication thereby conveyed, still, for several and obvious reasons, we have deemed it best, and have throughout so acted, to leave our readers to judge for themselves of the degree of excellence of communications, and of the value of their contents. It is only when some opinion therein stated requires especially to be noticed, either for explanation, recommendation, or dissent and reprehension, that we deem it necessary and proper, and in no manner disrespectful to any other of our contributors or readers, to offer comments of our own. On this occasion we cannot refrain from calling attention to the uncommon and valuable facts stated above—and still more to the circumstances under which the improvements were made; because these circumstances, even more than the results, prove that hundreds of thousands of acres in Virginia, may be highly improved, and with great profit, which have served merely as places of temporary sojourn for individuals or families, until they had spent their estates, and taken the next movement, to the western wilderness. We allude more especially to the country which surrounds each of our towns, and is near enough to supply their markets. Commodore Jones' farm is so far removed from one of these, that few individuals so situated would have thought of using it as a vegetable market; and still fewer as a source of supply for manures as heavy as lime. Yet who, among the most sanguine, could have hoped for more improvement of soil? Or who, among the most avaricious, could have required more clear profit in farming, than he has achieved? If the position of our correspondent should be even considered as on the utmost verge of the territory improveable by vicinity to towns, still the circle around each would be 18 miles in diameter, and the whole space so improved would yield net agricultural profits surpassing those now derived from one-third of the state. Besides, in each of these circles, half the proprietors would have means and facilities far better than those of our correspondent, either in closer vicinity to the market for sale of

products, and the source of supply of putrescent manures—of water carriage—or of beds of marl, on the spot, which would save the most costly, and yet the most profitable expenditure which he has incurred, for the purchase of lime. Yet these parts of our country surrounding the towns, so susceptible of profitable improvement, are, with a few rare exceptions in particular farms, among the poorest in the state. Especially around this one, Petersburg, and even within the distance of the farm of our correspondent from his market, there are lands having ten-fold advantages for improvement, and which would now sell for $6 the acre, and which bring no real profit to the present cultivators even at that price of purchase, or valuation of capital. Yet there is marl either on, or not distant from these lands, and the richest of putrescent manures in the town, which may be bought for 25 cents per load of 20 bushels; and of which nine-tenths rot in the town, and serve only to poison its air, because the neighboring farmers will not move them away at that low price, or even if given to them. There might be secured, within six miles of this town, independent fortunes for one hundred improvers like our correspondent, on tracts of land which now yield little or nothing to their cultivators.

But to all this the answer is ready, from every one who is thus neglectful of the means proposed: "If all within six miles of Petersburg, or even of the more populous town of Richmond, were to pursue this course, the markets would be soon glutted with supplies from the land; and the now plentiful and cheap sources of manure would be used up, without supplying half the demand." So it might be, if *all* were at once to adopt the same course of reform and improvement. But no such fortunate and general and simultaneous change is to be expected, or hoped for; and for any number who *will* take the course recommended, there is no danger of their wanting either the proper supply of manure, or the demand failing for their products. And if, in the earliest possible time, every farmer within ten miles of Washington, Richmond, Fredericksburg, Petersburg, and Norfolk, should improve his land and increase his products as much and as rapidly as Com. Jones has done, there can be but little question that their markets, both for sales and purchases, would grow as fast as their own improvements. The very poverty and unproductiveness of the adjacent country, and the consequent scarcity and high price of supplies to the markets, is one cause that retards the growth of the towns; and even though a better supply of the markets might reduce prices somewhat, yet by making the demand larger and always certain, the suppliers would, on the whole, be better rewarded than now.

It would be one of the greatest of blessings to Virginia if her other own native-born sons would generally do as this one has done; but if not, it would be the next in value if some hundreds of the more industrious, prudent, and economical Yankees would come and colonize the agricultural wastes which are to be found within a few miles of each of our towns, and profit fully by the resources which the present proprietors neglect, and suffer to be totally lost.—Ed. F. R.]

From the Franklin Farmer.

EXPERIMENTS OF GEN. JAS. GARRARD WITH VARIOUS GRASSES.

To the Editor of the Franklin Farmer:

Sir—Upon the subject of grass, I have found no such essay or notes as you suggest, was left by my farther; he may have left such essay or notes, and should I in future find any, you shall have the full benefit of the same. As to my being able to treat the subject with that justice which its importance demands, I feel myself quite incompetent to the task; and not knowing the manner or design of the committee, I am unable to communicate what little knowledge I have upon the subject, so as to be of much use to them. Some of my father's experiments with grass, were made before I was of an age to notice or feel any interest upon the subject. He tried several varieties of grasses, among which were timothy, blue grass, clover, (three varieties,) orchard grass, red-top, meadow-oat and rye-grass, the last of which grew only from spring until winter and was killed by the frost, from which I conclude it could be of but little use in this country although held in high estimation among the farmers of England, from whom he procured the seed when on a visit there. Red-top is suited only to low, wet, marshy land, and having but a *small* portion of such on his farm, he made but a partial trial as to its *qualities*. It yields very abundantly and is a good hay when put upon land that suits its growth. Upon high lands it will not do so well as low, wet marshy lands—this, I think, from the trials I have myself seen made in Kentucky and Ohio. Meadow-oat he tried and thought well of as a grass to make hay; the greatest objection was to the time when it needed cutting, which was when the corn-crop needed undivided attention. It has the advantage of being cut the second time of good seasons, with a good yield, and answers very well to be mixed with red clover—both ripening at the same time, and being well saved, makes an excellent food for cattle and horses. Red clover he tried as a hay grass; he admired the hay, but owing to the difficulty of saving, together with the disadvantageous time of saving, he abandoned the use of it for that purpose. The white clover is well known, and is inferior to the red, for the various uses of that grass. The scarlet was a variety which he procured in France, while on a visit to that country; it was the prettiest grass I ever saw, but the winter killed it as it did the rye-grass. Orchard-grass he did not like for a meadow-grass for several reasons; it was equally objectionable with the meadow-oat and clover, a

to the time of cutting—it grows too much in detached sods and does not sod completely the ground—the hay is too coarse and rough—cattle and horses are not as fond of it as clover or timothy; but for a pasture grass he admired it particularly when sown with other grass. It is much earlier than blue grass, timothy or clover, and affords grazing at a season when it is most needed, and upon the whole he thought it a valuable grass. Timothy he preferred as a meadow-grass to either of the others which he tried. He tried sowing at two different seasons, and on different kinds of land. He objected to spring sowing on two accounts; one was the difficulty of getting the ground in a suitable order to receive the seed; and another was, if any weeds were in the ground, they grew up faster than the grass and injured the meadow. He preferred old land for meadow, it being less liable to have weeds, and the grass not so liable to fall; and from the different trials he made, was of the opinion that one season with another yielded a better crop, and furthermore, you were improving land that most needed it. He also tried fall sowing in different ways, with and without grain, with grain, (usually wheat,) he first prepared the ground very nicely by ploughing and harrowing, and, sowing the grain and leaving the ground as level as possible, sowed the timothy seed and did nothing more. The objections to this mode of making meadows are two-fold—1st, It is one season before you get any benefit of the grass, and another is, the timothy goes to seed before the wheat is cut and the heads of the grass are cut off in cutting the wheat which usually causes your grass to be too thin; likewise the stubble is very much in the way in mowing the next year. He preferred preparing the ground well in the month of September and sowing the seed and then rolling the ground, which broke all the clods and leveled the ground, which is an advantage in mowing. He preferred sowing it much thicker than is common among farmers. A gallon to the acre is what is generally used; a peck is nearer what should be used. By sowing in the fall, and sowing thick, you at once sod your land and are enabled to derive full benefit from it the next season, and in addition, it keeps the weeds from growing up in your meadow; whereas the usual idea is, sow thin and let your grass-seed get ripe before cutting, in order to set your meadow more effectually; by so doing, all the vacant spots of ground most certainly grow up in weeds, thereby injuring your grass, and finally your meadow. The primary object of grass in this country is for grazing purposes; for this purpose we wish to put two kinds of land in grass—our new or wood-land, and our old worn out lands. Our old lands we usually sowed in wheat or rye, and then in March, when the ground is thrown up by the frost, we sowed a mixture of timothy, blue grass and clover, and of late mixed some orchard-grass, which is, I think, very advantageous. In this way the grain protects the grass from the heat of the sun, and by the time you wish to turn upon your stubble, you reap the benefit of the stubble, and at the same time knock the seed off your grass and more effectually set your ground. Some difficulty is experienced by Kentucky farmers in getting their wood-lands set in grass, and it arises from two causes—the time of sowing, and the grass being pulled up by the roots by the stock in grazing. The last is the cause of the general failure in putting our hill-lands in grass, as a remedy for which, I would suggest two means—1st, Sow your grass as soon as you save the seed, say in July or August; at that time the leaves of the former year are sufficiently rotted for the seed to germinate and grow; the trees likewise furnish shelter for the seed, and by fall, your grass has begun to take root, and then the falling of the leaves furnishes a protection to the young grass during the winter, and enables the grass to take root sufficient to keep the stock from pulling up the sods in grazing. All stock should be kept off until your grass seed is ripe, and then turn on as much as the grass will support for two or three weeks, which is as long as it should be grazed the first season, or at any rate until late in the fall. We generally sow some timothy and clover seed the spring following the sowing of the blue-grass, but I think the fall would be best for sowing the timothy, for the same reason advanced in relation to the blue grass.

Let those who doubt the philosophy of the above remarks relative to sowing grass, *try it for themselves*. Should you, or the commiftee, be able to glean any thing from the above remarks, that they or you may think, could be of any benefit to the country, I shall feel myself amply paid for the little trouble it may have put me to, in the reflection that I have thus been instrumental in communicating such information.

I remain, your ob't, serv't.,

CHAS. T. GARRARD.

Bourbon County, Ky., Jan. 15, 1839.

THE ADVANTAGE OF STEAMING FOOD FOR STOCK. CULTIVATION OF CORN.

To the Editor of the Farmers' Register.

King William, February 1839.

I have been using the root-steamer described in the Cultivator, of January 1838, for the last 12 months, and am so much pleased with it, that I cannot refrain from adding my testimony in its favor, and recommending it to my brother farmers. Mine was made by directions given in the Cultivator and has fully answered my expectations. My method of using it this winter, when, from the dry summer and fall, we had so few vegetables, has been as follows. When fattening my hogs, all the corn they consumed was steamed until it became perfectly soft upon the ear, which, of course, saved the trouble of shelling and the toll of grinding. Upon this food almost exclusively, with the addition of a few vegetables which we could spare from the garden, steamed with the corn, I fattened my hogs, and never had as fat hogs before, or as cheap pork. The corn, in steaming, increases nearly double in quantity, and I think a saving of at least one-third may be calculated on. After my hogs were killed, we began to steam for beeves, milch-cows, hogs, and horses. My plan is to put a sufficient quantity of shattered corn for my hogs in the bottom of the boiler, then ears of corn for my horses, short corn, cotton seed, vegetables, &c., for my cows and beeves, and then fill up with shucks, or any other coarse provender for the oxen. The shucks, from steaming, become very soft, and are greedily

eaten by cows and steers. The shattered corn, together with the liquor in the bottom of the boiler, I have found excellent food for sows with young pigs. I would recommend the use of steamed-corn for horses as the most economical mode of preparing it, I have tried it particularly for old horses, and have no doubt from an experiment I have made in fattening a very poor horse, that it is equal to any food for that purpose. The trouble of shelling and sending to mill, as also the toll for grinding, is saved on this also, while the quantity of food is increased by the cobs which are all eaten by the horse. I believe a saving of one-third or one-half may be made in feeding horses on steamed-corn, as well as hogs. Some farmers will say this steaming is too troublesome; but I can assure all such, they will be amply paid for all trouble and the small expense attending it. The consumption of wood is very inconsiderable; and with the attention of a small boy, I am enabled to save one-third of my provender, increase my milk and butter, and keep my horses, oxen and hogs, in good order. We use the boiler or steamer also to heat water to kill hogs, and other purposes; mine holds about 35 gallons.

After seeing your remarks upon the Chinese corn humbug, I took the trouble to count the grains upon one stalk of my Maryland twin-corn. The product was 3500 grains from one; 1400 more than the Chinese, if I recollect it aright. I would be glad if I had an opportunity to send the stalk to Mr. Thorburn, of New York. I am still pleased with this variety of corn, and shall plant no other this year.

My present method of cultivating corn, is the following: The 11 feet old wheat beds are broken up in the fall by reversing them with a double plough, well harrowed, and sometimes re-ploughed in the spring. With a small plough we run one furrow on each side of this bed, say two and a half feet from the centre, so as to have the two rows upon the double bed five feet apart, and allow six feet in which to have the water furrow. In these furrows the corn is dropped, say 18 inches on rich or manured land, and two feet on the poorest parts, and cover with a double-horse harrow. The cultivators are immediately started and continued until the corn is large enough to thin, when we run the same double-horse harrow with the front and hind tooth taken out immediately upon the corn. I believe this to be more beneficial than any other working given the crop, it breaking and pulverizing the hard ridge of land between the hills effectually, which no other implement could do by horse-power. The hands follow immediately and thin, which is very easily done, and set up the stalks which may be mashed down. Then cultivators again until just before harvest, when the dirt is thrown to the corn with small ploughs. Some of the advantages of this system are these: It is easier to reverse eleven feet beds than to list upon them, as you always have a furrow ready to receive the land. The corn-rows are uniformly high, whereas, when listed, you have a high and a low bed alternately through the field. The harrow works much better on 11 feet than on a 5½ feet bed. We save all hoe-work, I did not hand-hoe a single row last year, and made something like 60 barrels to the hand, on land of medium quality. The harrow we use is very simple, consisting of four pieces framed together in a square, braced in the corners, and has teeth only on the circumference; they run deeper, and consequently pulverize the land better than those having teeth in the middle, or in every cross bar.

EDWARD HILL.

From the Maine Farmer.

BREED OF SWINE.

Messrs. Editors:—I have been for many years engaged in raising hogs and making pork, and am fully convinced that much of the profit of that business depends on the breed. "The old fashioned, thin, long legged, long nosed, gaunt bodied" kind, are hardly worth keeping. They are continually uneasy and squealing, feed them as much as you will. This kind, however, is fast disappearing and their place being supplied by those that are better; among which the Bedford will take the first rank. This breed was introduced into Massachusetts, several years ago, and Oliver Fiske, of Worcester, who has much experience in the business of raising pork, says "experience has proved to my satisfaction that the Bedford breed is far the best that has been introduced into our country. They are quiet in their nature, fat easily, and with little expense or trouble. I have had them at 12 months old weigh 340 lbs. and a considerable number at 18 months old 400 lbs."

Levi Lincoln, late Governor of Massachusetts and President of Worcester Co. Ag. Society, has given his opinion of this breed of hogs, in the following language:

"I have great pleasure in voluntarily offering myself as your compurgator in the representations with which you have recently favored the public, of the Bedford breed of swine. The care and perseverence which have marked your attention to the prospects and value of these animals, and the success which has followed your exertions to introduce them to the favor of *practical* farmers, require, at least, an acknowledgement of obligation from all those who have been particularly benefited by your liberality, and from no one more than from myself. This breed of swine has taken the place of a long legged, long nosed, flat sided, thriftless race, called by some the *Irish* breed, by others the Russian, which would barely pay by their weight for ordinary keeping, and never for one half the expense of fattening, if, indeed, grain would make them fat.

"I had three pigs butchered from the same litter, precisely seven and a half months old. Their weights, when dressed, were 230, 235, and 238½ lbs. One sold in Boston for 6¼ cts. per lb.; the others were put up here for the family use. The expense of keeping and fattening these pigs, I am satisfied, was less than with any other breed I ever raised, and the proportion of bone and offal to the valuable parts, was surprisingly small. I have fifteen more on my farm, part designed for the market in the spring, and part to be kept over as store swine, and their appearance will furnish ocular satisfaction of the propriety of all which has been said in favor of the breed."

A pair of these pigs was first sent to this county by the duke of Bedford as a present to General Washington, by a farmer by the name of Parkinson, who resided near Baltimore. Instead of

delivering them to the General, he sold them. The first that came into Massachusetts were sent by Gen. Ridgly of Pennsylvania, to Col. Pickering of Salem, who has taken great pains to preserve the breed pure, and introduce them among the farmers of that state. Mr. John Reed of Roxbury, obtained them from Col. Pickering, and Mr. Fiske of Worcester, had them from Mr. Reed. In 1835 Mr. Sandford Howard, who then lived in Hallowell, purchased a sow and I purchased a boar from Mr. Rowland Howard of Easton, Mass. who had them from Oliver Fisk. All the hands through which they passed, from their first introduction into this country until they were brought to this town, are careful breeders of pure stock, and much pains has been taken to preserve this breed pure, and avoid breeding in-and-in. That is, propogating offspring among the same litter. No reasonable doubt can therefore exist but that the breed was introduced into this state in its purity.

Since I have had them, I have found them to fully sustain the reputation given to them by the breeders in Massachusetts. They are very small boned, in proportion to the size. Quiet, easily fatted, do much better on raw food than any other kind, and obtain a good size at an early age.

I have crossed the pure Bedford with the $\frac{1}{2}$ Bedford and half Macky, making the progeny $\frac{3}{4}$ Bedford and $\frac{1}{4}$ Macky, but found very little advantage from the crossing. One of these pigs I wintered last winter on 8 lbs. of raw mangel wurtzels per day, and she kept in good condition, and brought a litter of 10 pigs in April, a few weeks previous to which, I fed her on the slops from the house. Nine of the pigs lived, and made fine hogs. During the summer she lived principally on grass with a few raw potatoes, and in October she had another litter of 13 pigs, four of which, however, owing to an accident, died. She was then kept on boiled pumpkins, oats and peas, and barley-meal. Since then, she has lived entirely on raw ruta baga and mangel wurtzels, at the rate of about 12 pounds per day with an opportunity to burrow on the manure heap, and is now in good condition.

I killed one of the pigs which was $\frac{7}{8}$ Bedford and $\frac{1}{8}$ Mackay, when nine months old, that weighed 302 pounds. He was fed on the slops from the house, during the summer, and the last two months was fed on meal and corn. When I first commenced feeding him on meal he ate about two quarts per day, but after 5 or 6 weeks he would not eat more than one quart. He gave the most meat in proportion to the bones, of any hog I ever killed, and I think was the cheapest raised. Others who keep this breed have made the same statement. There was one of the pure Bedford breed killed in the neighborhood 14 months old, that weighed 385 and another 18 months old, that weighed 420 lbs. neither of which had any extra keeping.

Between the 20th of March and last of May, I shall have 14 litters of pigs, two of which will be the pure Bedford, and two will be $\frac{7}{8}$ Bedford and $\frac{1}{8}$ Mackay, with which I can supply any persons who may be in want.

Any persons who are desirous of examining this breed of hogs can do so by calling at my farm, about $2\frac{1}{2}$ miles from Hallowell Vilage.

J. WINGATE HAINES.

Hallowell, Feb. 13, 1839.

From the London Gardeners' Magazine.

WEEDS AS MANURE, AND VARIOUS REMARKS.

Sir,—From reading the review of Cruikshank's Practical Planter in your vol. p. 448, I am led to make a few straggling observations. The system I advocate is equally applicable to horticulture as to agriculture. Cruikshank says, as quoted by the review, (p. 453,) "It may seem a very paradoxical fact, but it is nevertheless true, that wood, instead of impoverishing the ground on which it is produced, nourishes it." (To be sure it does.) "There is very little of our waste land, that if trenched or ploughed will carry even a moderate crop of grain, unless it receive a considerable quantity of manure. After bearing timber, however, the contrary is found to be true." So the old vague, unphilosophical, unmeaning, foolish theory of rest is demolished at last, or rather explained. His subsequent reasoning is bad. Farther on, (p. 454,) he says, "That the soil should be enriched by the production of wood, when the experience of ages has proved that it is always exhausted by other crops, will seem to them a paradox of the most extravagant kind." By this statement it does. But other crops are carried off annually by man or beast, root and branch. This I shall explain. Cruikshank's theory is not confined to wood; it includes all vegetation. This is a truth as palpable to every one, when pointed out, as the rotundity of this globe, or the simple act of Columbus' making the egg stand on end; yet it is no less lamented than true, that notwithstanding all the splendid talent which has been exhibited, from Tull to the present day, this very obvious fact should not have been long ago adopted as a fixed and leading principle in all agricultural and horticultural operations. It stares us in the face in the forests and prairies of this country, the pampas of Buenos Ayres, the dirty summer fallows of England, and every where and in every thing. The principle of a clean naked fallow (fortunately a rare occurrence,) is utter annihilation. Had farmers and gardeners been able to eradicate weeds as they are called, the soil would have been a *caput mortuum* long ago. But weeds—like the principles of liberty—destroy, hack, hew, and persecute as we may, rise again in due time, not to injure, but to fertalize and benefit. We must follow nature; all other guides are fatal *ignes fatui*. "He that made the earth gave it laws that 'tis not good to break." After much steady observation, thought and practice, for some years past, I am perfectly convinced that all applications, no matter how large, of animal manures, animal substances, and minerals, are comparatively nugatory, without profuse supplies of vegetables and their roots; and I am not sure that an occasional liberal dressing of wheat flour, Indian corn-meal, &c. would not be the most profitable manure of all. Lions and tigers prey on flesh; and the vegetable monarchs of our forests attain their highest majesty on vegetable food, and in due time, return again to the soil, to produce increased fertility. This is very obvious on the banks of the Ohio and Mississippi; and vast masses too, of drift wood are carried into the ocean every flood. Does all this timber grow and die to no purpose? What is the man's religion who says it does?

The second extract from Cruikshanks is by no means a correct statement. If wood-lands were kept clean, and all the leaves and dead branches car-

ried off, the trees grubbed up root and branch, again replanted, and so on, the soil would eventually become as barren as any cotton or tobacco plantation in the southern states, and that is poverty with a vengeance. The cause of this is obvious; but not to the planters. They say it is the tariff. Oh! for the school-master! The fact is, when wood-land is cleared in this country, the crops are often very moderate until the progress of decay has brought the roots into action. I will illustrate this farther. The general system of farming in this state is, Indian corn, often very foul—oats, (a wretched crop in this hot climate,) or barley—then a very moderate dressing of manure, and a bountiful crop of weeds are ploughed in, producing a very fair crop of wheat, much better than the skill of the farmer deserves. The crops obtained are not at all warranted by the quantity of manure applied. Clover and timothy for two or more years, and often as long as it will mow and pasture, then Indian corn again, and so on. The old sod is usually ploughed in the spring, then corn planted in May. For some time it exhibits a very sickly yellow and poverty-struck appearance, until the green roots and weeds begin to decay; it then grows with great luxuriance and beauty. If after wheat, the land is ploughed before the weeds can grow, and sown with buckwheat in July, which is a very clean crop, the succeeding crop of Indian corn is very poor. Further, Cruikshank says, "Trees draw their nourishment from a much greater depth than any of the grasses, roots, or different kinds of grain." I doubt this very much as taking place to any extent.

He would infer that trees fertilize the soil, not by adding any thing to it, (except leaves, &c.) but by not taking any thing from it. The great bulk, nearly the whole of all the trees' roots, I have seen many, are within two feet of the surface. It is their decay which enriches the soil. They exhaust and then enrich. I lay no claim to the original discovery of this principle: it has been loosely hinted at and described by various writers; but I think I may venture to say, that I am the first farmer who has employed it in his rotation of crops; and I will venture to say, that at no distant day it will entirely change the present results in the best system of agriculture, especially in hot climates. I have had, and have several pupils, young men of talent and capital, well convinced of the truth of what they have learned, and competent to practise it. As with all improvers, a due proportion of sneers, scorn, derision, and ill-will has fallen to my share; and, as usual, those who know, observe, and ask the least, talk the wisest and most learnedly. To the want of vegetable food, I entirely attribute the frequent failure of grass, clover, turnips, saintfoin, &c., in England, and under the improved system of farming; and the cleaner the land is kept, I suspect the more they fail. To say the land is tired, proves something is wrong, but explains nothing. I am quite satisfied that the crops under the old wretched system of farming, were much better than under the new, in proportion to the manures, skill, management, &c., applied in both instances. Weeds, misplaced except in summer fallows, were the old farmer's salvation; but he did not know it. Weeds do not rob the soil; they either enable the farmer to do so, or prevent him, as the case may be; they keep up the fertility of it; they rob the crops, but not the soil. I see it often mentioned in your magazine as a great advantage to leave fruit borders uncropped; this is not nature's way of proceeding; and those who do not follow her laws make sad work of it, sooner or later. I should greatly prefer sowing them with clover, grass seeds, turnips, lupines, borage marigolds, or even weeds, yes, weeds, the vile things, &c. &c., manure and top dress them, and dig them in half, full grown, and ripe. I do so in my garden with great success. I shall not now say much of my own farm, as any detailed account would be unintelligible and unsatisfactory, for many reasons, and not altogether belonging to your journal. My present purpose is to direct the attention of horticulturists to vegetable manures. Nine years ago, my farm was almost a *caput mortuum*, owing to unusually bad management long continued. One of my neighbors, a farmer by intuition, a Minerva-born, learned at all points, said lately to one of my pupils, "It will be so again in five years." Query—if this system has put my farm on the road to matchless fertility from utter exhaustion in a few years, by what scorpion process is it to destroy it in five more? Have you any Minervas in England now? They are far more plentiful here than rattlesnakes, and far more mischievous: the latter bite only when injured. I have reached 70 bushels of Indian corn per acre; next year I fully expect 100 or more. Indian corn rather exceeds beans in England, the land being equal. I raise finer crops of Swedish turnips here than I ever saw in England or Scotland, or grew myself in England. They have never once failed in the nine years. I sow them after wheat and barley, the same season. My farm is 100 acres; about 75 under the plough: the rest in grass. My rotation is 8 years, growing in that time eighteen to twenty crops, (in the southern states much more might be done,) above one-half harvested, and the remainder ploughed in; all the rest is in strict accordance with English and Scotch principles. I have now growing the fourth crop this season on some of my fields. It matters not what crops we grow; it is the use we put them to that does good or evil. I shall make this season yard-manure sufficient for 45 or 50 acres. I could manure my whole farm annually by eating all my Indian corn, (18 acres,) and not selling any straw, (next year I begin to sell it,) with 18 acres of turnips and other crops. This could hardly be done in any country in which Indian corn will not grow, with turnips as a second crop. This system leads me to the belief that all crops are exhausters and improvers, (independently of their subsequent application,) just in proportion to what they take out of the soil, (if one crop really takes more than another,) and what bulk and quality of roots they leave behind. This I take to be the true solution of the old doctrine of rest, which signifies an accumulation of vegetable matter in the soil, which, when man destroys, barrenness is the result. Clover is considered one of the best improvers, and so it is; yet it is one of the greatest exhausters, until its roots are decayed, as are all grasses and green crops. I have top-dressed clover in the spring with yard-manure; mowed the first crop; ploughed in the second; sowed turnips, which were very poor; the succeeding crops, rye and corn, were excellent. I plant Indian corn for green fodder, after harvest, in June and July, on wheat and rye stubbles, and after a second crop

of clover ploughed in. After the wheat and rye, the corn comes up dark, healthy, and vigorous; after the clover, yellow, sickly and unthrifty, but recovers. The succeeding crops after the clover are superior. In both instances the corn grows from 7 to 10 feet high. The ears form well, but do not ripen, making most excellent [stock] food. The pigs steal the ears, whilst the steers and cows eat the blades, (leaves.) Wheat, barley, &c. absorb what is in their roots in ripening; clover, turnips, &c. being not permitted to ripen, do not. Indian corn, horse-beans, &c. cut partially ripe, are intermediate between these two. If a field of rye or any other grain is harvested, and another ploughed in green, and both sowed with any other crop, that crop will grow for a considerable time much better after the former than the latter. I do not yet see the philosophy of this. Is the soil more exhausted whilst the rye is yet green, (always admitting that it returns more than it takes, after it decays when ploughed in,) than after it is ripe and all the roots gone? My observation would lead me to suppose that it is. All this puzzles me. When a crop of grain is ploughed in green, the land turns up almost like an old sod, and full of roots; so much so that we can scarcely cover the corn. Indian corn is universally grown in this country, and so ought horse-beans to be in England, in all soils that will grow them. The former matchless crop you cannot grow unless you can raise the temperature at midnight from 70° to 84°; I have known it 85°, and felt it. Meal and turnips are much superior for fattening cattle to either alone. This practice, with green crops ploughed in, as far as the climate will permit, would revolutionize the face of the whole of this country.

Is all this nonsense and quackery, or is it a bomb-shell cast into the established system and opinions? My views, I think, show the very impoverished condition of the soil whilst clover is living, and its great fertility when decayed. Wheat fails after clover in Scotland and the north of England, and is by far the best after it in this country. Difference of temperature will account for this. For the "something is removed," read, "the clover roots being decayed makes the wheat successful." There is nothing removed but the poverty, which is unfavorable to wheat. These somethings, rootings, and tirings are poor guides and explanations. There is much to be learned and done yet in England as well as elsewhere, and it needs no ghost to tell it, in this most difficult and complex, most noble and godlike of all the arts and sciences. The future condition of hot climates is a darling dream of mine. All that has yet been done (with the exception of this country,) and how transcendant in some instances! was previous to the art of printing, or when it was of little value. The day is not far off (and close at hand, if free trade were established, so much talked of every where, and practiced no where, or likely to be so soon; northern countries had better keep trade as it is, as long as they can,) when hot climates will as far exceed cold ones, (the minerals alone of the United States would make a respectable island,) in productiveness and variety of food, comforts, luxuries, &c., and arts, sciences, and refinements, personal size, strength and beauty of man and beast, as latitude 52° now exceeds in all these latitudes 60°; and the face of nature will be as much more intensely green too. But all this is as heterodox, visionary, and absurd here now, and in "the fast anchor'd isle," as republicanism was 60 years ago every where. In less than another century, poor despised and neglected agriculture and its professors will be at the top of the ladder; "they who are first shall be last, and they who are last shall be first," if I read the glorious and cheering signs of the times rightly. We are thought little of here I assure you. What stronger proof of this is required than the fact that our farmers themselves think meanly of the first and most important of all professions? Please to put this on record from a man who has seen, thought, and read much, and who does not herd much with the world as it now is. When a man advances any thing new and startling, perhaps his readers have a right to know something of his pretensions. I give you some of mine. I was a pupil of the late excellent Mr. Runciman, of Woburn, and of that matchless man and farmer, Mr. Blomfield, of Norfolk. I resided a short time in the immediate neighborhood of the late Mr. Rennie of Phantassie. I was two years at Edinburgh College, and one season at the Royal Institution in London. I made an agricultural tour on foot over the greatest part of Scotland, and some parts of England; this was no education for fitting a young man of ardent mind and feelings for the yoke of tithes, game-laws, &c. But enough: I left relations, a few friends, home, country, and property, and I am content.

P. S. I see in your publications, American plants and bog-earth always coupled together. This country is not a bog, nor any thing like one. Rhododondrons, azaleas, &c. grow in this neighborhood on the dry steep declivities of gneiss and hornblende rocks; and thousands of rhododondrons grow in the state of New Jersey, upon sands as dry and barren as those of Brandon in Suffolk. I am not accustomed to writing, as you will perceive, and I fear my story is somewhat confused, but of the truth of its principles I am well convinced from experience. They will bear study and investigation.

Are air and water of any other use to vegetation than to ourselves? Plants absorb and decompose them; so do we: poor diet alone, notwithstanding. Does not vegetation derive all its food from what exists in the soil, and is not vegetable matter the beef and bread of vegetables? For this purpose weeds grow. My experience says something for this doctrine. Nature, farms and manures as well as man; but he has got it into his head to reject her assistance, and do things his own way.

GEORGE H. WALKER.

Longford, Holmesburg, near Philadelphia, lat. 40°
December 24, 1830.

[The writer of the foregoing article was a strong and original thinker, and, as his contributions to this journal have shown, excited interest in regard to every thing which he touched in writing, even when his meaning was very obscure, (as it often was,) or when his propositions were most opposed to the reader's opinions. But though the doctrine and practice here set forth were unquestionably original with Mr. Walker, (for he was one of the last men who would have assumed the merit that belonged to another,) it is nevertheless certain

that the great and important and then novel system of manuring of land with its own vegetable growth, (or weeds,) is the main object, and most important item of value of the agricultural work of Col. John Taylor, of Virginia, which was first published nearly thirty years ago, and the rules of which the author had pursued still earlier in his regular cultivation. Clover, or weeds, to be left, or turned in, as manure, was one of the regular crops in Taylor's rotation. The misapplications of the rule, both in precept by the author, and in practice by himself and still more by his disciples, have been numerous and very injurious; and the instructions for practice of 'Arator' have been found totally worthless, for the purpose of making natural poor land very fertile, (or even to raise any kind above its natural degree of fertility,) by means of the land's manuring itself with its own vegetable products. But the want of effect is owing to the soil's being so constituted as to be incapable of retaining and profiting by the manure—and not because of the manure wanting value, or that Taylor had over-estimated its value, for soils needing the application, and capable of profiting by its value. Though we have elsewhere combatted the opinion of Taylor as to the general application of his doctrine, and have shown the injury to the progress of improvement caused by relying on the mis-application, (Essay on Calcareous Manures,) still none will go farther in applauding the principle of his doctrine, and in maintaining its *proper application* to be the very corner-stone on which to construct any plan of enriching land. And it has been acted upon, to more or less extent, wherever agriculture has been pursued with profit, though wastefully and without the operator's knowing, or generally having the least idea of, the manner in which nature was aiding and adding to his manuring processes.

The general theory or principle may be thus concisely stated: All vegetable matters, in proper state of decay and decomposition, serve as food for other growing vegetables, and of course for manure to soil needing it. Growing vegetables derive but part of their nutriment from the soil, and the remainder, (and a large portion,) from the air and from water, the elements of which become fixed in the plants, and serve as much to increase their substance, and their amount and value as manure for soil and food for future plants, as the other food which had been deposited by nature or by art in the soil. The power, too, to draw upon, and avail of this atmospheric manure is in proportion to the quantity and suitableness of manure in the soil. Therefore, whatever the natural soil, or manure applied, furnishes of food to a growing crop of plants, as much more, (or twice or thrice as much, it may be in certain cases,) does nature add thereto, by furnishing to and accumulating and fixing in the plants the elements of air and water. Thus, the crop which drew from the soil say 30 parts of its sustenance, derived thereby the power to draw 30, or perhaps 70 other parts from the inexhaustible sources of air and water; and the whole amount, if used to manure the soil, by being suffered to die and decay on it, will serve to again double or triple its amount and value for the next year's growth, by drawing a like addition from the atmosphere. In all vegetable and putrescent manures, more or less of this multiplying aid of nature is in useful operation, though it is not understood, nor suspected, by those who derive the benefit. And if it were not for this bountiful aid of nature, and the cultivated earth or plants received no more manure than man gives, or by possibility can afford, the most gentle and what is now the most improving system of cultivation, would be utterly and rapidly destructive of the fertility of the soil.

The farmer should continually bear in mind the general truth of this doctrine of Taylor's; and thence learn, and practise accordingly, that every load of manure, every addition of fertilizing power he gives to his field, bountiful nature multiplies in quantity and effect. But let him also beware of misapplying his efforts to soils not constituted to profit by them. The profuse supply of nutritious food, to a diseased stomach incapable of digesting and accumulating what is furnished, will not add to the flesh or the health of the subject; and the naturally poor land, the disease or constitutional defect of which is the want of calcareous matter, is as little fitted to retain, assimilate, and profit by, the supplies of vegetable matter which the unrestricted application of the doctrine of Taylor would direct to be given.—Ed. F. R.]

For the Farmers' Register.

IMPROVEMENT OF LAND BY GRASS HUSBANDRY. HAY-MAKING.

Dr. Dwight has said, (if the document I quote from is correct) in speaking of the new land of the United States, "wherever the forest trees have been undisturbed by fire, they have accumulated, by shedding their foliage through a long succession of ages, and by their own decay, a covering of vegetable mould from six to twelve inches deep, and sometimes from eighteen to twenty-four. This mould is the best of all soils, and eminently friendly to every species of vegetation. It is indeed no other than a mere mass of manure, and that of the very best kind, converted into mould; and so long as it remains in considerable quantities all grounds produce plentifully."

"From this source it has arisen that all the unburnt new lands, in the northern, middle, southern and western states, have been, and still are

uniformly valued beyond their real worth. When the tract on the Green Mountains in Massachusetts was first settled, the same luxuriant fertility was attributed to it which has since characterized Kentucky. About the same time it was ascribed to the Valley of Housatonac, in the county of Berkshire. From these tracts it was transferred to the lands in New Hampshire and Vermont, on the Connecticut, and thence to those in Vermont on the western side of the Green Mountains. From these regions the paradise has travelled to the western part of the state of New York, to New Connecticut, to Upper Canada, to the countries on the Ohio, to the south-western territory, and is now making its progress over the Mississippi into the newly purchased regions of Louisiana. The accounts given of all these countries successively, were extensively true; but the conclusions which were deduced from them were in a great measure erroneous. So long as this mould remains, the produce will regularly be great, and that with very imperfect cultivation; for the mould in its native state, is so soft and light, as scarcely to need the aid of the plough. But this mould after a length of time will be dissipated. Where lands are continually ploughed, it is soon lost; on those which are covered with grass from the beginning, it is preserved through a considerable period. At length, however, every appearance of its efficacy, and even of its existence vanishes.

"The true object of inquiry, whenever the quality of a soil is to be estimated, is the nature of the earth immediately beneath the vegetable mould, for this in every case will ultimately be the soil. If this is capable of being rendered, by skilful cultivation, regularly productive, the soil is good; if not it is poor."

There is much truth in the foregoing extract, but I think there is also some error. Where lands are covered with grass from the beginning, unless they are constantly kept close mowed and grazed, the mould will not disappear; otherwise the prairies of the west which have been in grass, probably for ages, instead of being the richest of lands, would be now poor. Nor have they escaped the hoof and the tooth; for the vast herds of buffaloes which inhabited these countries prior to the settlement of the white man, derived their chief subsistence from them.

It is true, however, that the tracts of country described as having successively borne the character of eminent fertility, have one after the other lost it. And it is owing to their being "continually ploughed," whilst the whole crop has been taken off without any return, which is generally the case where a scarcity of animal labor exists, and the husbandman makes no effort to supply the deficiency through the resources of nature.

If productiveness is to be restored only by "skilful cultivation" on the European system of applying artificial manures, at great expense of human power, as I suppose Dr. Dwight means, I fear, for a long time to come, the occupants of these lands have rather a gloomy prospect, as labor is likely to continue dear with us through many generations. And the new Eldorados of the west, pursuing the same course, must meet the same result, until at last the whole of our vast republic will feel the evils of a barren soil. European agriculture, such as that of England and Flanders, is inapplicable here; and if our soil and climate did not afford us the means of obtaining fertility, without the expense of labor applied there to farming lands, our situation would be dreary. Fortunately the difficulties of scarce and dear labor are compensated by ample space, and our climate for the most part enables us to employ the means of covering the lands, which our space admits of being consigned to rest with a growth calculated to heal their wounds.

The grasses are the agents we must chiefly employ in this work, aided when practicable by minerals; not that they are the only ones, but such others as are now known consume more time than the short life of man can spare. Could American ingenuity be earnestly directed to this subject, I doubt not new sources of power would speedily be developed. We know such powers exist in nature to considerable extent, from the number now in use, and which might perhaps be enough if they were attainable every where. But lime and marl are too bulky to be transported great distances, and there are many situations where gypsum does not act, and others where it cannot be obtained. It would be extremely unphilosophical to conclude that we are acquainted with all the agents of this character, and the analogy of nature would rather lead us to infer there are many more, and perhaps some within the reach of all. There is a peculiar propriety in expecting these discoveries from American genius. Whilst it has a special bias to immediate utility, it has shown itself equal to any efforts. The disarming the lightning of the clouds, and the almost practical annihilation of the distances of earth, although the most splendid instances of its power, are only higher examples of an abundant stock of talent similar in kind, but not so conspicuous—perhaps not so fortunate. The Patent Office at Washington, affords many proofs to sustain this assertion.

There can be no question, I think, as ascertained by the experience of many, that the vegetable mould is restored to exhausted lands by putting them down in grass, and allowing them to remain long enough in that situation for the decomposition of the roots and tops of the grasses which have grown thereon. Even when grazing and mowing are practised in moderate degree, that result is not prevented, provided a moiety of the top is left in the one case, or the second crop in the other.

This is a consideration of great importance to a large portion of Virginia, already too much reduced in fertility to yield a profit to cultivating labor, and having no resources for restoration except those which the hand of nature yields. Fortunately the poorest lands are capable of producing some kind of useful grass, and there is none but has some fertilizing quality. They all too, yield with tolerable management, good hay, a resource of the utmost consequent to an impoverished farm, and which is far more neglected in that portion of the state that needs it most, than could have been anticipated from the intelligence of the people on other subjects. When hay is obtained in abundance, the corn may be spared the process of stripping the blades before the grain is perfected, which so materially diminishes its product. Fat meat, milk, and butter, follow in the train of good meadows; and every animal on the farm, more or less, participates in the advantages. Red clover,

as a fertilizer, is the chief and is the best known; and fortunate is the land-holder whose soil produces it abundantly. But the process of making hay from it in an economical manner is not generally understood, and it may not be useless to mention a few leading facts that may serve to simplify the ordinary mode, as practised in too many situations, since hay-making is one of the most important preliminary steps to improvement. When the heads of the grass begin to turn brown, and about half the crop has assumed that hue, which occurs in this latitude and elevation between the 20th of May and the middle of June, it is generally thought to be in the best condition for cutting. The swarth should be permitted to lie as cut, to receive the influence of the sun, until towards the approach of night, when it should be raked together and thrown into small cocks from three to fourt feet in height. If the weather continues fair it may remain in this situation three or four days, then be opened and exposed to a day's sun, and collected in cocks again at night, three or four times the size of the first. Most commonly the next day, (or in any event by being spread open to another day's sun,) it will be fit to stack, which can be known by its feeling dry and elastic, like tobacco in good pressing, or (as it is called with us,) "*prizing*" order. In this state the green color is preserved to a great extent, and the smell is as fragrant as that of the finer kinds of tea. In wet seasons the process is more difficult; but unless the rains are constant, opportunities most commonly occur, to open the grass long enough to have it dried by the sun, which should be done as soon as possible after the sunshine appears, when it may be either cocked again, or stacked, according to its condition. If it is suffered to remain wet long, it becomes hot, turns black, acquires an offensive smell, in short, runs through the process of putrefactive fermentation, which unfits it for the food of animals. But if this process can be checked and the grass got dry enough to put away in bulk, by taking such intervals of fair weather as the season affords, still a good hay may be obtained, although it has been wetted more than once; but by no means as good as if the weather had been uniformly fair. Some persons reccommend sprinkling salt on the hay when put up, should any dampness exist in it, in order to preserve it. I infinitely prefer putting it away dry, and in our climate that may almost always be done. The hay is best which is cured enough to house or stack with the least exposure to the sun or rain, and a little experience will teach the farmer to avoid the evil of over drying on the one hand, or not drying enough, and thereby incurring the risk of putrefaction on the other. Clover being a grass with coarse stalks, when stacked in the fields and exposed to the weather, it admits more water into the bulk than finer grasses, and consequently much more of the hay is damaged, and rendered unfit for use, than occurs in similar situations when other grasses are used. Where hay is most wanted too, there is generally the greatest deficiency of house-room to receive it; and even where the homestead furnishes that, it is laborious and inconvenient at the busy season of hay-making to haul all the hay in. A simple contrivance in a great degree remedies these inconveniences, and has been practised on the writer's farm for a number of years with entire success. It merely consists in putting a layer of rye or any other long straw, on the clover at every two or three feet as the grass rises in the process of stacking, taking care that the straw projects six or eight inches from the body of the stack, and when it is finished bending the projecting straw downwards, so as to make it resemble the eaves of a house. If the stack when finished is well capped with straw, these eaves will conduct off nearly all the water that falls on it, and the grass will keep almost as well as that which is sheltered by a house. The quantity usually put in a stack here is about as much as can be drawn by a team with hay-ladders, sixteen feet long, at five or six loads.

Timothy, (*phleum pratense,*) the next favorite in central Virginia, does not flourish well on the eastern side of the Blue Ridge as far south as this, when standing alone. It rarely yields more than two good crops before it surrenders the ground to other grasses. But when mixed with red clover it is both more vigorous and more lasting. The impenetrable shade furnished by the clover seems to protect it from the action of the sun, and preserves that moisture in the land so congenial to it. There may be other influences also, for the grasses prefer the neighborhood of each other, and are generally so found in state of nature. Clover ripens earlier than timothy, but if they are cut as soon as the latter blooms, a most excellent hay is obtained, the clover not losing much by over-ripeness, whilst its brittleness, and liability to loss in moving, is counteracted by the greater pliability and toughness of the timothy. I think a larger crop can be obtained from the mixed grasses than from either singly, and it is certainly easier to cure the clover in wet seasons when mixed with timothy, than when alone. The pasturage is much better also than from either singly; the autumnal growth of the timothy affording good grazing when the clover has dried; and, when the ground is not over-stocked, I have known the pasture to be good in the middle of winter.

Orchard-grass (*dactylis glomerata*) is not likely to answer well here. It grows freely only on the richest lands, and requires frequent and heavy manuring to keep it up; affording no adequate compensation for this trouble, as the hay from it is coarse, and by no means as acceptable to horses as clover or timothy. 'Tis true it yields earlier grazing in the spring than the other grasses, but is not much less injured by it than they are. A few lots for the latter use may be advisable, but it cannot be recommended for the fields.

There is much land with us that will not bear clover or timothy to any extent, and yields very little from culture of any kind of grain. The soil is generally pale yellow, or inclining to white, when wet, breaking up to a great depth, and when dry almost impenetrable by the plough. The prospects of the cultivators of such lands would be hopeless, if no succulent grass could be produced by them. And there is fortunately one, the herds-grass or fox-tail (*alopecurus pratensis*) that seems peculiarly adapted for their use. It grows tall enough to make hay where no other valuable grass would attain that height without manure, and when it cannot be cut for hay, yields pasture. As there is so much of the kind of land here attempted to be designated, sometimes in tracts of several thousand acres, sometimes in quantities varying from one hundred to twenty acres, and lying as if it were dove-tailed into the

best farms of the country, it is important to know if a profitable use can be made of it by any convenient process. The wood that grows on it is generally short, scrubby, and crooked, mostly fit only for the fire, except when it consists of pine, which is by no means of superior quality. Crops of grain raised from it being meager and unprofitable, pasturage seems its most appropriate application. But there is one serious difficulty that attends that use. The running-brier, commonly called the dewberry, grows with so much rapidity, and in so much profusion, that the land in the course of a year or two of rest, is almost as completely covered with it as other fields are with grass. I know of but one remedy—that is to allow the farm-hogs to winter on the ground where it grows. They are exceedingly fond of the root, and in pursuit of it, extirpate the brier more effectually than any other enemy. It remains to be seen if the grass will bear to have its roots as much turned up without destruction, as may be necessary to remove this pest.

I am not aware that any chemical analysis has been made of this soil, but it is to be classed with those which Sir Humphrey Davy describes as "stiff clays approaching to pipe clays in their nature." And which he truly says in dry weather "cake and present only a small surface to the air; and the vegetation on them is generally burnt up almost as readily as on sands." It is important this land should not be confounded with the grey soils, that having a red substratum, but a surface not much unlike, and chiefly to be distinguished by the lofty and healthy timber of the one, compared with the scrubs of the other. The grey lands are the best we have, being as productive in moist seasons as any, and far more so in dry, as was evident through the intense heat and drought of the last summer, as on previous occasions of a similar character. They strongly reminded me of the following description of the philosophical chemist, previously quoted:

"The power of soils to absorb water from the air is much connected with fertility. When this power is great, the plant is supplied with moisture in dry seasons, and the effect of evaporation in the day is counteracted by the absorption of aqueous vapor from the atmosphere by the interior parts of the soil during the day; and by both the exterior and interior during the night." (Agricultural Chemistry, p. 128. Philadelphia, 1821.)

The green grass, *(poa viridis,)* of inestimable value on soils adapted to it, does not grow abundantly here; nor do we know the means of propagating it extensively by art. In lime-stone regions of any fertility it abounds, and on the second low grounds of the western rivers, affords fine hay, and pasture, unrivalled by any others. But in Eastern Virginia I have never seen it cover a large surface in any one place, or grow tall enough, except in very few instances, to make hay worth cutting. It is becoming more abundant, 'tis true, in our improved lands, thereby indicating a disposition to increase with increasing fertility, and may hereafter be an important ingredient of our pasture fields; but without the aid of water holding calcareous matter in solution, (as is the case in the valley,) I do not anticipate much benefit from it as a meadow-grass. I will close this communication by observing, that the mode of making hay from all the grasses mentioned, except clover, is exceedingly simple. The principles are the same; but the application in the latter cases far more easy. If care is taken to dry the grasses with as little loss of their color and juices by evaporation, as may be compatible with attaining a state of dryness, and elasticity under such pressure as can be given by the hand, good hay may be made. It is far more easy than to cure corn-blades; and a hand will save more forage in a good meadow in one day than he can do by pulling corn-blades through a week. THOMAS MASSIE.

Nelson County, March 1st, 1839.

From the Maine Farmer.

VALUE OF ROOT CROPS.

The importance of raising roots to be used as food for cattle, horses and swine, during our long winters, cannot be too often nor too strongly impressed upon the farmers of Maine, at least until more of them enter somewhat more largely into the business than they do at present.

Potatoes are planted by every one as a matter of course. Next to potatoes perhaps the ruta baga crop commands the most attention. The sugar beet is next in order, though of but recent introduction. Mangel wurtzels have not generally found so much favor with the farmers of Maine as they ought to; nor has the carrot—but the most neglected of all is the parsnip. We do not recollect of ever having seen a field of parsnips growing in Maine, and yet we verily believe that, all things considered, they are the most profitable of either as an article of food for stock and swine. We have heretofore tried some experiments on a limited scale with them, and, providence permitting, we shall go more extensively into it another season. They require a little more care when they first come up, and are smaller than ruta baga, but are not so difficult as the carrot. They seem to be more nourishing than any other root, and chemical analysis warrents this idea. They will keep in the ground during the winter, but must be dug before they vegetate much in the spring. They will not keep so well in the summer as the Ruta Baga. The farmers in the Island of Jersey near England, are said to make their main dependence upon this root, and their cattle and swine are thereby rendered very profitable. The only objection that we know of to the carrot is the trouble it gives in weeding when it first comes up. Its small leaves so much resemble some of the weeds, that if the ground is very foul, it requires careful management to avoid hoeing it up with them. We have seen the good effects of these upon a horse to which they were given during the winter season. They certainly are preferable to oats, or at any rate were for that horse. The animal was a very fleet one, and belonged to a neighboring physician, who had a great deal for him to do; and yet he kept in perfect condition with no other food than good hay, and from a peck to a bushel of carrots per day.

The mangel wurtzel will yield when put in a favorable situation as much per acre, perhaps, as any other root. John Hare Powell, once raised sixteen hundred and thirty-four bushels to the acre and 14 rods; and Messrs. H. & T. Little, of Newbury, raised thirty-three tons, ten hundred and four-

teen pounds to the acre. But English writers have told us of sixty tons to the acre. We believe that it requires a richer soil than ruta baga, and more of a clayey loam. Hogs are very fond of them. We saw Mr. Haines of Hallowell feeding his swine with them last fall, raw, and the manner in which they took hold of them, and the good condition which they exhibited convinced us that they were very profitable and nutritious to them. See his communication in the last number of the Maine Farmer. The more we see and learn of the value of the several root-crops in Maine, the more convinced are we that it is the true policy of our farmers to cultivate them extensively; and we hope that many who never have yet paid particular attention to this business, will begin this year. Manure high and plant close, and we will insure you a good and a profitable crop.

From the Farmer and Gardener.

INEFFICACY OF OYSTER-SHELL-LIME.

January 25th, 1839.

Dear sir—Having expressed an opinion unfavorable to the oyster-shell-lime as a manure, which appeared to not coincide with yours, I will proceed to state my reasons for this (it may be) singular opinion.

In the year 1832, I burnt about 2000 bushels, from which I made a compost, one-half at least of which was composed of rich earth collected from fence rows, which had remained mellowing and enriching itself for at least twenty years. In the autumn of the same year, I applied the compost broadcast on my wheat ground, and ploughed it in with the wheat. The result was exceedingly favorable, which I then attributed to the effects of the lime. I have since been convinced, it was partly the rich earth before mentioned, (as a large proportion of the compost,) and of deep ploughing.

In the early part of the year 1834, I burnt about 4000 bushels, and spread it on a field of 24 acres, that had been ploughed in the preceding autumn. In the spring it was harrowed with a heavy three-horse harrow, and cultivated twice previous to putting it in corn. The corn was carefully cultivated, and in the month of August sown in timothy. There has been no benefit perceived from the application in either the crop of corn or timothy.

In May, 1837, I gave the oyster-shell-lime a more distinct trial. In part of the field I spread on a clover-lay 200 bushels barilla-ashes per acre; on the other part of the same field, and all the land equally good, was spread 100 bushels oyster-shell-lime per acre. The whole was ploughed in early in June, when the clover was in blossom. The field was ploughed three times previous to sowing the wheat. The result was, the wheat on the ground ashed, yielded an abundant crop, and that on the ground limed, scarcely paid the expense of cultivation. In several other parts of my farm, I have applied the oyster-shell-lime extensively, and have in no instance experienced any beneficial result.

One of our very intelligent Maryland farmers assured me he always doubted its efficacy, and had paid particular attention to its results for the last fifteen years, and in no case has he discovered any benefit from the application of the oyster-shell-lime.

In reply to your inquiries of the oats sown by me, and quantity produced per acre, I take much pleasure in informing you, that in the year 1837, I sowed 10½ acres in what is generally called the Poland oats, and the produce was 650½ bushels well cleaned merchantable oats, and a small quantity unmeasured, say 15 bushels light, that would answer all the purposes for feed to my stock—I am under the impression the yield would have been larger had not they fallen about the time they were maturing.

In 1838, I sowed 13 acres of the same oats, the produce 715 bushels. The mode of cultivation was, to plough the ground deep in the preceding autumn, and again in the spring, after it had been well harrowed; I am under the impression the above is the general mode of cultivation, but of that I am unable to form a correct opinion, having never sown oats on my farm until the year 1837.

A SUBSCRIBER.

IMPROVING LAND BY LIMING.

To the Editor of the Farmers' Register.

The communication in the inclosed number of the "Farmer and Gardener, [inserted above,] on the inefficacy of *shell-lime*, seems to require some notice. Such an article, emanating, as it seems, from a practical farmer, and referring to numerous experiments to prove the utter worthlessness of what has heretofore been regarded as "the basis of good husbandry," is well calculated to encourage the indolence and incredulity that have so long retarded the progress of agricultural improvement in our country. Having read, reflected, and observed a good deal on the subject, we beg leave respectfully to express our dissent from the views of the writer; and in the course of the following observations, theoretical and practical, shall appeal to science, authority, and experience, in support of an opposite conclusion.

The objections of the writer seem to be confined to *shell-lime;* and the first inquiry that suggests itself is, whether chemically considered, there be any difference between this and *stone-lime?* And if not, whether there be any virtue as a fertilizing agent in the one which the other does not possess?

Chemists inform us that pure or quick-lime is the *oxide of calcium*, and is obtained by exposing *carbonate of lime* to a heat, by which the *carbonic acid* is expelled, and the pure or quick-lime remains. The true calcareous element, carbonate of lime, is uniformly the same, in nature, properties and effects; and chemically considered, lime is the same, but in a less or greater degree of purity, whether obtained by burning common lime-stone, oyster-shells, or the pure carborate of lime, such as Iceland spar, or Carrara marble. Many lime-stones are exceedingly impure, some of them containing as much as 10 per cent. of magnesia and other impurities, either inert or hurtful to vegetation. Oyster-shells, on the contrary, consist almost entirely of corbonate of lime and animal matter; which animal matter is expelled by calcination, and if it were not, could not be injurious to vegetation. Upon principle, therefore, there can be no reason assigned why *shell-lime* should not be as beneficial in agriculture as that procured from the stone.

We do not know how we can better enforce our theoretical views on this subject than by citing the

authority of professor Ducatel in the following extract from his geological report. After giving the analyses of 10 specimens of lime-stone, from Baltimore, Harford, and Frederick counties, Maryland, he proceeds:

"It will be perceived that three out of ten are magnesian lime-stones; all of them contain more silica or sand than has been found in oyster-shells, and one, said to be most extensively used in Harford county, contains as much as 11 per cent. of inert matter. It follows, therefore, that as oyster-shells are composed nearly of pure carbonate of lime, they will afford a lime containing scarcely an appreciable quantity of impurities. If well burnt, (which is the case when no efferverescence is observed on treating them with a weak acid,) lime obtained from them may be deemed, with a fractional difference, equal, weight for weight, to the best stone-lime; and as their chemical composition does not vary, there is nothing to be deducted from the value of the product in consequence of the impurities that exist, as exhibited by the foregoing table, in most lime-stones, and that must necessarily form a part of the residue when *these* are burnt.

"If the comparative value of the two products be estimated by measure, a greater difference is discovered; but there is at the same time a disproportionate difference in price. A bushel of the best alum-lime weighs from ninety to a hundred pounds; whereas, the same bulk of shell-lime, unground, weighs from sixty-five to seventy-five pounds, and perhaps when ground would weigh eighty pounds—a difference of from twenty to twenty-five per cent. But the former costs from thirty to thirty-five cents at Baltimore, the most convenient spot for its delivery on tide-water, where the latter can be had for ten cents; whilst farmers conveniently situated on the bay side, might themselves burn the shells at an expense not exceeding six cents a bushel. These remarks refer to the lime obtained from recent or fresh oyster-shells; but there is little or no difference between it and that procured by the burning of those contained in the Indian shell banks, provided proper care be taken to separate them from the black mould and dirt with which they are mixed.

"It has been supposed, that because alum-lime has been found to admit of a greater mixture of sand than shell-lime, in the making of mortar, it was to be inferred that it is correspondingly better, or, as it is termed, *stronger* for agricultural purposes. But this is an unwarrantable conclusion; for, as this circumstance seems to depend upon the peculiar aggregation among the particles of the lime, which prevents it from *setting* too rapidly, (or, in other words, attracting water and carbonic acid from the atmosphere sooner than the wants of the mason require,) it would appear, on the contrary, that if any inference is to be drawn from it, it is adverse to the conclusion; whilst, on the other hand, the fact that shell-lime *sets very quickly* is favorable to the opinion, entertained by some persons, of its superior efficacy in agriculture—it being generally understood that lime acts in the soil in the condition of carbonate of lime. Admitting, however, that the peculiar arrangement of the particles in stone-lime which renders it in general coarser than the lime obtained from shells, may better fit it as a mechanical amendment to certain soils, the difference is at most as one to three, according to the datum upon which its superiority is predicated; namely, that in the preparation of mortar, stone-lime will bear three times as much sand as shell-lime. But even in this respect the conclusion is not warranted, except perhaps in the case of a purely sandy soil, in which lime *alone* would, it is believed, prove of little service."

Shell and *stone*-lime may therefore be regarded as nearly equivalent substances, and may be applied in agriculture with equal, if with any benefit. If the majority of our farmers were what they ought to be, reading men, it would be deemed unnecessary at this late day, to enter into an argument to prove the beneficial effects of lime in agriculture. The works of Sir H. Davy, M. Puvis, and other standard authors, and the contributions of many practical correspondents already published in the Register, taken in connexion with the eminent success of its application in Pennsylvania, in many other parts of our own country, and over nearly the whole of Europe, are sufficient to satisfy any person whose prejudices are not unconquerable. But as these works are by no means generally read, it may not be amiss to cite in a few words one of the very highest authorities in practical agriculture, Robert Brown, of Markle, author of the article "Agriculture," in the Edinburgh Encyclopædia. He says: "In fact, the majority of soils cannot be cultivated with advantage till they are dressed with *lime;* and whether this beneficial effect, shall be considered as an alterative, or as a stimulant, or as a manure, it will be found to be the basis of good husbandry, and of more use than all other manures put together. Whenever lime has been properly applied, it has constantly been found as much superior to dung, as dung is to the scrapings of roads or the produce of a peat mire."

That errors have been frequently committed in the use of lime, in consequence of which, injury rather than benefit has resulted in many cases from its application, cannot be denied. What may have been the cause of the failure of the experiments of the writer in the 'Farmer and Gardener,' it is difficult at this distance to say; but doubtless, if all the circumstances were known the reason might be readily assigned. Perhaps the soil was already sufficiently calcareous; or was deficient in *insoluble* vegetable matter; or contained a quantity of *soluble* vegetable manure, which was destroyed by the action of the *quick-lime;* or the writer may have expected a greater and more immediate return from the lime, than could be reasonably anticipated. Let us examine his communication and see if one or the other of these reasons will not account for the failure of his experiments and his consequent disappointment.

His first experiment was with lime used in compost. The result was exceedingly favorable, although he is now unwilling to give the credit of the improvement to the lime. This experiment of the writer is the only one in which his practice seems to have conformed to the principles of science and the experience of the best practical farmers. This method of using lime is almost the exclusive practice of the best cultivated districts on the continent of Europe, and has been successfully practised within my own knowledge, by some of the best farmers in Virginia. On this subject M. Puvis uses the following language: "Lime in compost is never injurious to the soil.

It carries with it the surplus of alimentary manure, which the surplus of product demands for its sustenance. Light soils, sandy or gravelly, are not tired by a repetition of this compost. No country nor author charges lime used in this state with having been injurious to the soil. In short, this means, seems to us the most sure, the most useful, and the least expensive mode of applying lime as manure." This experiment, as might have been anticipated, was attended with success. The next experiment was the application of 4000 bushels of *quick-lime* on 24 acres of land that had been ploughed in the preceeding autumn. We have no information as to the previous condition of the land; whether calcareous or not, whether rich or poor, whether abounding or deficient in vegetable matter. It may be fairly inferred, however, that the land was poor, (for regarding lime as a manure it would be natural to apply it to the poorest land,) and that the scanty coat of inert vegetable matter that was ploughed down in the fall, had been in a great measure decomposed before the application of the lime in the spring. Now to say nothing of the excessive quantity applied, any one at all acquainted with the properties of *quick-lime*, might have predicted with certainty, that this application of it upon a naked soil, containing little or no insoluble vegetable matter, would be without effect, or positively injurious. The following extract from Davy's Agricultural Chemistry, a very high authority, is to the point. "The solution of the question, whether *quick-lime* ought to be applied to a soil, depends upon the quantity of *inert* vegetable matter that it contains. The solution of the question, whether marl, mild lime, or powdered lime-stone ought to be applied, depends upon the quantity of calcareous matter already in the soil. All soils which do not effervesce with acids are improved by mild lime, and *ultimately* by quick-lime, and sands more than clays."

The last and "most distinct experiment," was the application of 100 bushels of quick-lime per acre on a field of clover in the month of May, which was turned in early in June, when the clover was in blossom. This application, which the writer seems to consider perfectly conclusive of the question, signally failed; the wheat crop on the limed land having been barely sufficient to defray the expense of cultivation! Nor is this to be wondered at. So utter a disregard of the principles of science, and the lessons of experience, could not have been attended with any other result. On this subject we again quote the high authority of Sir H. Davy: "When a soil, deficient in calcareous matter, contains much *soluble* vegetable manure, the application of quick-lime should always be avoided, as it either tends to decompose the soluble matters, by uniting to their carbon and oxygen, so as to become mild lime, or it combines with the soluble matters, and forms compounds, having less attraction for water than the pure vegetable substance." In the experiment under consideration, quick-lime is applied to a crop of green clover, one of the most succulent and soluble plants in nature, and immediately turned in so as exclude the atmosphere. Now what is the necessary consequence? The quick-lime, which naturally tends to absorb carbonic acid and become mild, being excluded from the atmosphere, the usual source for supplying that acid, naturally combines with the carbon and oxygen, the main constituents of the clover, and which united, form carbonic acid, and becomes again the carbonate of lime, and by this process the rich soluble vegetable manure of the clover, on which the principal reliance for the crop of wheat ought to have been placed, is destroyed; and the inconsiderate experimenter, instead of this abundant supply of alimentary manure, has on his land one hundred bushels of carbonate of lime, which might have been obtained at much less expense in the shape of marl, effete lime, ground-shells, or pounded lime-stone.

"Quick-lime, (says Sir H. Davy,) whether in powder or dissolved in water, is injurious to plants." The only immediate beneficial effect arises from its power of decomposing inert vegetable matter, and it is not until it re-absorbs carbonic acid and becomes mild that it seems to possess the peculiar virtues attributed to calcareous manures, in the 'Essay' on that subject, of correcting the acidity, improving the texture, and increasing the productive powers of the soil, by combining with and fixing putrescent manures. Whatever may be the cause, there can be no doubt of the fact that lime acts in a very limited degree on the first crop after it is applied. It is a prevailing opinion in Pennsylvania, that a winter must pass before its effects are fully developed. M. Puvis, who seems to have been thoroughly informed on this subject, thus expresses himself: "To secure the effect of lime on the first crop, it ought to be mixed with the soil some time before the sowing of the crop; however, if it is used in compost, it is sufficient that the compost may have been made a long time previously." And many of the experiments detailed by the author of the article in the Edinburgh Encyclopædia, already quoted, go to prove that the beneficial effects of lime are not experienced until the 2d or 3d year after its application, unless it is aided by a liberal dressing of manure. Lime should never be applied under the delusive belief that it is an alimentary manure. It should be considered not as the food, but the physic of the earth. Our poor acid soils may be compared to a dyspeptic patient, with a voracious appetite, but a disordered digestion. Neither too much food nor physic will be of service. But as a dose of magnesia administered to the dyspeptic will correct the acidity and restore the functions of the stomach and make "digestion wait on appetite," so a proper quantity of lime or other calcareous matter, administered to such soils, will correct their acidity, restore their digestive powers, and fit them for the assimilation of vegetable food, which the judicious farmer will not fail to supply in sufficient abundance.

In the course of the foregoing observations, we think it has been established that for agricultural purposes, there is no material difference between *shell and stone-lime;* that the value of lime in agriculture is sustained by science and authority; that its beneficial operation, when properly applied, has been fully vindicated by the first experiment of the writer under consideration; and the failure of his other experiments been satisfactorily explained, upon rational and scientific principles, without in the least degree impugning the value of this, to us on tide-water, inestimable improver of the soil.

We had designed to close this communication

with some details of our own experience in the use of lime. But the length to which we have unconsciously extended it, admonishes us to be brief on this head. Suffice it to say, that we have used *shell-lime* to a considerable extent for a number of years, and have never had our reasonable expectations disappointed. It is true, we never expected it to act like magic and make poor land rich at once. But it has never failed, to increase the crops, to improve the appearance and texture of the soil, and to insure the permanent improvement of the land by the subsequent application of putrescent manures. We have, however, always applied it, either in compost, (which we prefer,) or on land that has not been grazed the year previous, and have generally followed it by the application of alimentary manures. We are now preparing to apply about 2000 bushels upon a poor high-land soil; and as a preliminary step, are covering the thinnest parts of the land with leaves and vegetable mould from the woods. This land has not been grazed for two years, and has a considerable cover of inert vegetable matter.

Mr. Robert Bailey, one of your subscribers, in this neighborhood, has used lime in compost very extensively for a number of years, and with the most signal success. Having so improved the farm on which he resides, as to increase his average crop of corn from one and a half, the former product, to six barrels per acre, and to cause it to produce fine crops of wheat and clover where none grew before. He is now applying it on a larger farm, on a much more extensive scale, and during the last summer had on hand, as we were informed, about 10,000 bushels of shells. We have urged him repeatedly to communicate the result of his experience to the Register; and have threatened if he does not do it very soon, to have his premises surveyed, and a report made by another hand, of the great improvements effected by his well-directed energy and zeal.

We trust that the importance of the subject, and the injurious tendency of the erroneous doctrines we have been combating, will be deemed a sufficient apology for this long, and we fear tedious communication.

WILLOUGHBY NEWTON.

Westmoreland co., Va., March 8th, 1839.

[The article which Mr. Newton has answered above, had not escaped our notice, and it would have been republished before, and commented on, if it had not been without the responsible signature of a real name.

We join in the request to Mr. Bailey to communicate his experience in improving his farm, for publication in the Farmers' Register. He and sundry others of the residents of the tide-water region can present facts in support of the value of shell-lime, as well as of marl and of calcareous manures in general, which would out-weigh the opposing testimony of the writer in the 'Farmer and Gardener,' even if its importance were increased an hundred fold.]

For the Farmers' Register.

ESSAY ON VEGETABLE PHYSIOLOGY.

[Continued from page 70.]

CHAP. V.

STEMS. THEIR EXTERNAL FORMS. THEIR INTERNAL STRUCTURE. EXOGENOUS STEMS. MEDULLARY RAYS. WOOD. METHODS OF DETERMINING THE AGE OF TREES. SEASONING TIMBER.

Of true stems, that of the white-oak (*quercus alba*) may be assumed as the type. The stem of the white-oak, or the trunk, as it is more commonly called, rises like a column from the earth; largest near the surface of the ground, then gradually contracting in size, until near the point at which the first branches are inserted, where it again enlarges; thus forming a column, the curvature of whose surface is inwards. That this form is the best which the trunk could have, to enable it to resist the action of storms and high winds, is easily demonstrable on strict mathematical principles. Of this same fact, a remarkable experimental proof is afforded in the celebrated Eddystone light-house. Before the building of the present structure, several unsuccessful attempts had been made to erect a permanent light-house on the Eddystone rock. A little more than eighty years ago, Smeaton undertook the work, and as he states in his 'History of the Eddystone light-house,' took the trunk of an oak as his model. Since the building was completed, it has been exposed to the most violent storms—storms which have dashed the ocean waves over the very top of the building—and yet it has withstood them all uninjured.

From the form which the stem presents in the oak, we meet with many departures. In palms and similar trees of tropical countries, it does not divide into branches, but has the form of a simple cylinder, bearing a tuft of enormous leaves at its top. In other plants it lies like a cord on the ground, as in the cucumber, (*cucumis sativus.*) In others it takes a twining direction, often enfolding the largest trees in its coils. "In the Royal Museum at Paris, there is a specimen of a palm, so surrounded by an enormous twiner, as to be perfectly enclosed in it, as in a vegetable sheath; nothing but its extremities being visible." In most plants, the stem is solid; but in grasses and umbelliferous plants, it is hollow. In the tortoise plant of the Cape of Good Hope, it is a rounded knob, the bark of which is rent by deep fissures, causing it to present to the eye an appearance resembling that of a tortoise. In stapelias and some other south African plants, the stem is gouty, distorted and succulent, bearing soft projections instead of leaves. In the cactuses, it is sometimes flat, and divided into a number of leaf-like limbs; at other times, globular, and marked with soft projecting ribs, at others, angular and erect, rising into the air, a naked green club.

Stems, which have too little strength to stand erect, and sustain their own weight, together with that of their leaves and fruit, generally support themselves by fastening to some neighboring body. This they do either by coiling spirally around their support, as the pole bean, (*phaseolus vulgaris,*) or by means of thread-like organs called tendrils, as the common passion-flower, (*passiflora incarnata,*) or by what are termed aerial roots,

It carries with it the surplus of alimentary manure, which the surplus of product demands for its sustenance. Light soils, sandy or gravelly, are not tired by a repetition of this compost. No country nor author charges lime used in this state with having been injurious to the soil. In short, this means, seems to us the most sure, the most useful, and the least expensive mode of applying lime as manure." This experiment, as might have been anticipated, was attended with success. The next experiment was the application of 4000 bushels of *quick-lime* on 24 acres of land that had been ploughed in the preceeding autumn. We have no information as to the previous condition of the land; whether calcareous or not, whether rich or poor, whether abounding or deficient in vegetable matter. It may be fairly inferred, however, that the land was poor, (for regarding lime as a manure it would be natural to apply it to the poorest land,) and that the scanty coat of inert vegetable matter that was ploughed down in the fall, had been in a great measure decomposed before the application of the lime in the spring. Now to say nothing of the excessive quantity applied, any one at all acquainted with the properties of *quick-lime*, might have predicted with certainty, that this application of it upon a naked soil, containing little or no insoluble vegetable matter, would be without effect, or positively injurious. The following extract from Davy's Agricultural Chemistry, a very high authority, is to the point. "The solution of the question, whether *quick-lime* ought to be applied to a soil, depends upon the quantity of *inert* vegetable matter that it contains. The solution of the question, whether marl, mild lime, or powdered lime-stone ought to be applied, depends upon the quantity of calcareous matter already in the soil. All soils which do not effervesce with acids are improved by mild lime, and *ultimately* by quick-lime, and sands more than clays."

The last and "most distinct experiment," was the application of 100 bushels of quick-lime per acre on a field of clover in the month of May, which was turned in early in June, when the clover was in blossom. This application, which the writer seems to consider perfectly conclusive of the question, signally failed; the wheat crop on the limed land having been barely sufficient to defray the expense of cultivation! Nor is this to be wondered at. So utter a disregard of the principles of science, and the lessons of experience, could not have been attended with any other result. On this subject we again quote the high authority of Sir H. Davy: "When a soil, deficient in calcareous matter, contains much *soluble* vegetable manure, the application of quick-lime should always be avoided, as it either tends to decompose the soluble matters, by uniting to their carbon and oxygen, so as to become mild lime, or it combines with the soluble matters, and forms compounds, having less attraction for water than the pure vegetable substance." In the experiment under consideration, quick-lime is applied to a crop of green clover, one of the most succulent and soluble plants in nature, and immediately turned in so as exclude the atmosphere. Now what is the necessary consequence? The quick-lime, which naturally tends to absorb carbonic acid and become mild, being excluded from the atmosphere, the usual source for supplying that acid, naturally combines with the carbon and oxygen, the main constituents of the clover, and which united, form carbonic acid, and becomes again the carbonate of lime, and by this process the rich soluble vegetable manure of the clover, on which the principal reliance for the crop of wheat ought to have been placed, is destroyed; and the inconsiderate experimenter, instead of this abundant supply of alimentary manure, has on his land one hundred bushels of carbonate of lime, which might have been obtained at much less expense in the shape of marl, effete lime, ground-shells, or pounded lime-stone.

"Quick-lime, (says Sir H. Davy,) whether in powder or dissolved in water, is injurious to plants." The only immediate beneficial effect arises from its power of decomposing inert vegetable matter, and it is not until it re-absorbs carbonic acid and becomes mild that it seems to possess the peculiar virtues attributed to calcareous manures, in the 'Essay' on that subject, of correcting the acidity, improving the texture, and increasing the productive powers of the soil, by combining with and fixing putrescent manures. Whatever may be the cause, there can be no doubt of the fact that lime acts in a very limited degree on the first crop after it is applied. It is a prevailing opinion in Pennsylvania, that a winter must pass before its effects are fully developed. M. Puvis, who seems to have been thoroughly informed on this subject, thus expresses himself: "To secure the effect of lime on the first crop, it ought to be mixed with the soil some time before the sowing of the crop; however, if it is used in compost, it is sufficient that the compost may have been made a long time previously." And many of the experiments detailed by the author of the article in the Edinburgh Encyclopædia, already quoted, go to prove that the beneficial effects of lime are not experienced until the 2d or 3d year after its application, unless it is aided by a liberal dressing of manure. Lime should never be applied under the delusive belief that it is an alimentary manure. It should be considered not as the food, but the physic of the earth. Our poor acid soils may be compared to a dyspeptic patient, with a voracious appetite, but a disordered digestion. Neither too much food nor physic will be of service. But as a dose of magnesia administered to the dyspeptic will correct the acidity and restore the functions of the stomach and make "digestion wait on appetite," so a proper quantity of lime or other calcareous matter, administered to such soils, will correct their acidity, restore their digestive powers, and fit them for the assimilation of vegetable food, which the judicious farmer will not fail to supply in sufficient abundance.

In the course of the foregoing observations, we think it has been established that for agricultural purposes, there is no material difference between *shell and stone-lime;* that the value of lime in agriculture is sustained by science and authority; that its beneficial operation, when properly applied, has been fully vindicated by the first experiment of the writer under consideration; and the failure of his other experiments been satisfactorily explained, upon rational and scientific principles, without in the least degree impugning the value of this, to us on tide-water, inestimable improver of the soil.

We had designed to close this communication

with some details of our own experience in the use of lime. But the length to which we have unconsciously extended it, admonishes us to be brief on this head. Suffice it to say, that we have used *shell-lime* to a considerable extent for a number of years, and have never had our reasonable expectations disappointed. It is true, we never expected it to act like magic and make poor land rich at once. But it has never failed, to increase the crops, to improve the appearance and texture of the soil, and to insure the permanent improvement of the land by the subsequent application of putrescent manures. We have, however, always applied it, either in compost, (which we prefer,) or on land that has not been grazed the year previous, and have generally followed it by the application of alimentary manures. We are now preparing to apply about 2000 bushels upon a poor high-land soil; and as a preliminary step, are covering the thinnest parts of the land with leaves and vegetable mould from the woods. This land has not been grazed for two years, and has a considerable cover of inert vegetable matter.

Mr. Robert Bailey, one of your subscribers, in this neighborhood, has used lime in compost very extensively for a number of years, and with the most signal success. Having so improved the farm on which he resides, as to increase his average crop of corn from one and a half, the former product, to six barrels per acre, and to cause it to produce fine crops of wheat and clover where none grew before. He is now applying it on a larger farm, on a much more extensive scale, and during the last summer had on hand, as we were informed, about 10,000 bushels of shells. We have urged him repeatedly to communicate the result of his experience to the Register; and have threatened if he does not do it very soon, to have his premises surveyed, and a report made by another hand, of the great improvements effected by his well-directed energy and zeal.

We trust that the importance of the subject, and the injurious tendency of the erroneous doctrines we have been combating, will be deemed a sufficient apology for this long, and we fear tedious communication.

WILLOUGHBY NEWTON.

Westmoreland co., Va., March 8th, 1839.

[The article which Mr. Newton has answered above, had not escaped our notice, and it would have been republished before, and commented on, if it had not been without the responsible signature of a real name.

We join in the request to Mr. Bailey to communicate his experience in improving his farm, for publication in the Farmers' Register. He and sundry others of the residents of the tide-water region can present facts in support of the value of shell-lime, as well as of marl and of calcareous manures in general, which would out-weigh the opposing testimony of the writer in the 'Farmer and Gardener,' even if its importance were increased an hundred fold.]

For the Farmers' Register.

ESSAY ON VEGETABLE PHYSIOLOGY.

[Continued from page 70.]

CHAP. V.

STEMS. THEIR EXTERNAL FORMS. THEIR INTERNAL STRUCTURE. EXOGENOUS STEMS. MEDULLARY RAYS. WOOD. METHODS OF DETERMINING THE AGE OF TREES. SEASONING TIMBER.

Of true stems, that of the white-oak (*quercus alba*) may be assumed as the type. The stem of the white-oak, or the trunk, as it is more commonly called, rises like a column from the earth; largest near the surface of the ground, then gradually contracting in size, until near the point at which the first branches are inserted, where it again enlarges; thus forming a column, the curvature of whose surface is inwards. That this form is the best which the trunk could have, to enable it to resist the action of storms and high winds, is easily demonstrable on strict mathematical principles. Of this same fact, a remarkable experimental proof is afforded in the celebrated Eddystone light-house. Before the building of the present structure, several unsuccessful attempts had been made to erect a permanent light-house on the Eddystone rock. A little more than eighty years ago, Smeaton undertook the work, and as he states in his 'History of the Eddystone light-house,' took the trunk of an oak as his model. Since the building was completed, it has been exposed to the most violent storms—storms which have dashed the ocean waves over the very top of the building—and yet it has withstood them all uninjured.

From the form which the stem presents in the oak, we meet with many departures. In palms and similar trees of tropical countries, it does not divide into branches, but has the form of a simple cylinder, bearing a tuft of enormous leaves at its top. In other plants it lies like a cord on the ground, as in the cucumber, (*cucumis sativus.*) In others it takes a twining direction, often enfolding the largest trees in its coils. "In the Royal Museum at Paris, there is a specimen of a palm, so surrounded by an enormous twiner, as to be perfectly enclosed in it, as in a vegetable sheath; nothing but its extremities being visible." In most plants, the stem is solid; but in grasses and umbelliferous plants, it is hollow. In the tortoise plant of the Cape of Good Hope, it is a rounded knob, the bark of which is rent by deep fissures, causing it to present to the eye an appearance resembling that of a tortoise. In stapelias and some other south African plants, the stem is gouty, distorted and succulent, bearing soft projections instead of leaves. In the cactuses, it is sometimes flat, and divided into a number of leaf-like limbs; at other times, globular, and marked with soft projecting ribs, at others, angular and erect, rising into the air, a naked green club.

Stems, which have too little strength to stand erect, and sustain their own weight, together with that of their leaves and fruit, generally support themselves by fastening to some neighboring body. This they do either by coiling spirally around their support, as the pole bean, (*phaseolus vulgaris,*) or by means of thread-like organs called tendrils, as the common passion-flower, (*passiflora incarnata,*) or by what are termed aerial roots,

as the trumpet-creeper, (*bignonia radicans.*) It is a fact, worthy of remark, with respect to twining stems, that whilst stems of different species twine in different directions, the stems of the same species always twine in the same direction. The stem of the pole-bean always twines to the left; the same is true of the stem of the hop, (*humulus lupulus.*) It may be well to recollect this, as it is often necessary in gardening to start the young stem around its support. If either of the plants just mentioned, be started to the right, it will soon throw itself down; or, if confined in any way, so as to be forced to make a turn or two in that direction, it becomes puny and of little account. This is a wise provison of nature; as most twining plants send forth several stems to twine around the same support; if they did not all twine in the same direction, they must, of necessity, frequently cross each other. Whilst all were young, they would lie close to the body of the support; but as they increased in size, the inner ones, in consequence of their growth, would tend to force the outer ones further out; whilst the outer ones, for the same reason, would tend to bind the inner ones closer to the support. In this way they would either cut each other off, or at least, impair the freedom with which their sap could circulate.

The grape, passion-flower, &c., fasten themselves to their support by means of a class of organs, termed tendrils. These are slender thread-like organs, capable of coiling spirally, and thus fixing themselves to neighboring bodies. Tendrils sometimes proceed from the extremity of the leaf, and appear to be mere prolongations of the mid-rib, as in the sweet-pea, (*lathyrus odoratus,*) but more commonly from the stem itself, as in the gourd, (*cucurbita lagenaria.*) When these tendrils first appear, they are straight, and not coiled as we generally see them; but being possessed of a contractile power, the moment they touch any suitable support, their end hooks around it, and thus fastened, they go on coiling themselves until they are firmly fixed their places. If the tendrils of the gourd-vine be left to develope itself fully, without being suffered to touch any other support, it will be perfectly straight. If it be then brought in contract with a rod, or any suitable support, the moment its end touches the rod it will hook around it; if the rod be now moved towards the vine, the tendril will not unhook, as might be supposed, but will coil itself further around. In this way a straight tendril may be made to coil itself throughout almost the whole of its length, in the course of a few minutes.

Notwithstanding the great diversity of form, and external appearance, which stems present, their internal structure is remarkably uniform. Those of flowering plants, are all made up of tubes, woody-fibre and cellules, arranged in one or the other of the two following ways. First, the tubes and woody fibre are arranged in concentric bands, having the cellular tissue, in part, packed in between them, and in part forming lines cutting them at right angles, and radiating from the axis of the stem. Such stems increase by the regular addition of new layers on the outside of the old wood; and are thence termed exogenous stems, or growers outwardly, as the name imports. This is the structure of all of the trees, and most of the smaller plants of this country. Second, the tubes and woody fibre are disposed in bundles throughout the stem; the interstices being filled up with cellular tissue. The stems having this structure do not increase in diameter, after they are once fairly formed, but only in solidity. This they do by the addition of new bundles of tubes and woody fibre internally. Hence they have received the name of endogens, or growers inwardly. An example of a stem of this kind is furnished by the Indian corn (*zea mays*). Many of the large trees of tropical countries are constructed on this plan. These two classes of stems will have to be considered separately. As the former is by far the most common in this country, as well as the best understood, we will commence with that.

In a transverse section of an exogenous stem of one year's growth, the three following parts are easily distinguishable from each other. 1st, the pith, occupying the centre of the stem; 2d, a band of wood surrounding the pith; and 3d, the bark or external covering of the stem.

The pith, or medulla, as it is termed by botanists, is a cylindric column of spongy cellular tissue, commencing at the collar or neck of the plant, extending throughout the whole length of the stem, and terminating in the buds. Its size, as compared with that of the whole stem is variable. In the white-heart hickory (*carya tomentosa*) of one year's growth, the diameter of the pith, is about one-sixth of that of the stem; in the elder (*sambucus niger*) of the same age, it is two-thirds. Herbs and young shoots, in proportion to their bulk, have much more pith than trees; indeed this must necessarily be the case, as the column of pith when once formed, never increases in size. In newly formed parts, the pith is juicy, being filled with the ascending sap; in the same stem, when old, it is dry, colorless, and very light. At first, it is an unbroken column, and in most plants it continues to be so; in some instances, however, it is torn into separate pieces by the rapid elongation of the stem; as may be seen in the stem of the walnut (*juglans nigra,*) and still more distinctly in that of the poke-weed (*phytolacca decandra.*) Respecting the office of the pith, many singular opinions have been entertained. Amongst others, which it would be useless for me to mention at length, some of the earlier botanists imagined its office to be similar to that of the nervous system in animals. This opinion was based upon a fancied resemblance, in structure and position, to the spiral marrow of animals. If the pith does indeed possess the properties of a nervous system, some plants are much more highly favored in this particular, than even the higher orders of animals. So far as we know, the principal use of the pith, is to transmit nourishment to the buds during the earlier periods of their growth. When no longer filled with the juices of the plant, it is apparently useless. It seems to be a temporary provision, to enable the young plant in the first instance, and the young bud afterwards, to grow until their own systems of vessels are fully formed; after that is accomplished, it is thrown aside. Such temporary provisions are by no means uncommon in nature.

If we examine the band of wood, which surrounds the pith, we will notice that it is cut at right angles, by a number of their vertical plates, sent out in every direction, from the pith to the circumference of the stem. These are called me-

dullary rays, and are considered a part of the pith. Like the pith they are composed of cellular tissue; their more solid appearance arising from the strong lateral pressure to which the cellules have been subjected, by being interposed between plates of wood; thus giving to those cellules the form of thin parallelograms. These rays are channels of communication between the bark and the internal portions of the stem. Through them, certain of the elaborated juices which descend in the bark are carried in and deposited in the wood.

The wood, which exists more or less abundantly, even in herbaceous stems, and which forms so large a portion of those of trees and shrubs, in the stem which we have selected for examination, consists of a single zone or layer, composed of tubes and woody fibre, disposed without any regular order, except that the latter is the most abundant on the outside, next the bark. The second year of a plant's growth, a new layer is formed outside of the first, and similar to it in every respect. The third year this process is repeated; and thus the stem increases in size, a new layer being formed annually, as long as the plant lives. The wood of an exogen of one year's growth, may be viewed as an elongated hollow cone, extending from the base to the summit of the stem, and enclosing the pith. This cone does not extend further, nor does it enlarge in any way; but is surrounded, the next year, by another cone, which, like the first, after being formed, undergoes no change in dimensions. Hence as the necessary result of this mode of growth, the stem of an exogen is more or less conical.

As each layer, or to speak more accurately, each hollow cone of wood, is the result of a single years growth; it is evident that the age of an exogen may be ascertained by counting the number, or rings presented on a transverse section of the stem, made near its base. This may be done with great accuracy, in most trees of temperate and cold climates, in which, in consequence of the periodical suspension of vegetation, the annual layers are distinctly marked; but in the case of trees of the torrid zone, where vegetation goes on thoughont the year, this cannot be so readily done. In old trees, the rate of increase being very uniform, their age may be determined with considerable accuracy, by the inspection of a mere fragment of the stem, the diameter of the whole stem from which it was taken being known. A rough estimate of the age of a tree, is sometimes made, by dividing the semi-diameter of its base by the average increase of the species to which it belongs, that average being determined by previous observation. In these several ways, the ages of numerous very old trees have been determined. It should be remarked, however, that the determinations, except where they are based upon an actual counting of the rings presented by a transverse section of the trunk, cannot be regarded as any thing more than approximations to true age. A tree growing in peculiarly fertile ground, will enlarge much more rapidly than most other trees of the same species; and of course, with a given diameter, will have a less number of zones than the average. In the case of a tree growing in peculiarly barren ground, just the opposite effect would ensue. An estimate of the age of the first, made by dividing its semi-diameter by the average thickness of the zones of that particular species, would give too great an age. An estimate of the age of the last, made by the same method, would give an age less than the true one.

Another, and far more important source of error in the case of many very large trees, is to be found in the fact, that several stems, starting from the same root, sometimes become so thoroughly united, as to present to the eye the appearance of a single stem. Such, according to the testimony of most travellers, is the fact with respect to the celebrated sweet chestnut of Mount Etna; measuring 180 feet in circumference, or about 60 feet in diameter. Whilst speaking of the union of different stems, I cannot forbear mentioning a curious instance of it, which I had pointed out to me some time since. It was in the case of two trees growing two or three feet from each other. At a height of 14 or 15 feet from the ground, one of them had sent out a branch, which had become thoroughly incorporated with the trunk of the other. After this had taken place, the second tree had gradually decayed, between the point where this limb was inserted and the ground, until near the root, it was entirely dead. Yet at the time I saw it, several of its upper limbs continued to thrive, deriving all their nourishment from the roots of the second tree, through this branch. This may perhaps be considered an instance of natural grafting.

There is almost always a marked difference in color and density, between old and recent wood. The outer and more recent portions of the stem, have been called, in allusion to their color, alburnum; and in allusion to their office, sap-wood; the inner and older portions are termed the heart-wood. After a few years, the color of a layer of wood is changed, its density is increased, and it takes thereafter little part in the transmission of the sap. During the winter, it is true, it generally contains sap, but then this sap is rather deposited in it, than circulating through it. The change in color and density, by which sap-wood is converted into heart-wood, is caused by the deposition of a solid matter, peculiar to each species, in the tissues of that part. This matter is in most cases soluble in nitric acid, and hence it is, that if a piece of heart-wood be immersed in that acid, the color is discharged, and the piece again assumes the appearance of sap-wood. Where the matter deposited is a resinous character, as in the pines, it adds very much to the durability, and consequently to the value of the heart-wood. On this account, as well as on account of its greater solidity and strength, the heart-wood is universally preferred to the sap-wood, for use in the arts. As the layers of wood, in the course of a few years after their formation, cease to take any active part in the circulation of the sap, and, in time, become to all intents and purposes dead matter, it would naturally follow that the central part of the stem would be first to decay. Where the matter deposited in those parts is not of such a character as to protect them from decay, this is frequently found to be the case. The resinous matter, deposited in the heart-wood of the pine, is of such a nature as effectually to resist the disorganizing agencies which operate upon it; and hence it is that pines, even those of the greatest age, are never found hollow. But such is not the fact with respect to the matter deposited in the heart-wood of the sycamore, *(plantanus occidentalis,)* and hence all the oldest

tress of that kind, are little more than mere shells.

This last remark is not at all inconsistent with the one which immediately preceded it. Place sap-wood and sound heart-wood in the same circumstances, and the latter will far outlast the former. Such is the situation of the two when used as timber; but let the sap-wood retain its vitality, whilst the heart-wood is dead, (and such is their situation n the living tree,) and the former will far outlast the latter. The power of the vital principle to preserve organized matter from decay, is something which we cannot explain; but of which we see evidence every where around us. Let a leaf be severed from the parent-stem, and fall to the ground, whilst another just by its side, retains its connexion with that stem. The former, under the combined agency of heat and moisture, soon undergoes complete disorganization; a part of it rising into the atmosphere in the form of an invisible gas, whilst another part remains as earthy mould, to mark the spot where it fell. The latter, under the action of the same agencies, goes on unfolding itself, perfecting its structure, performing its vital functions, and "dreams not of decay," until the frosts of autumn bring it notice that its work is done. In the possession of vitality, living matter has a complete release, under the hand and seal of the creator himself, from the action of those agencies, which in ordinary circumstances would operate upon it. It is for the time being, absolved from all obedience to the chemical laws which govern common matter. This difference between living and dead matter is one which should be borne in mind in all our reasoning respecting organized matter, as well vegetable as animal; the neglect of it has been a fruitful source of error in times past.

Besides the peculiar secretions which are deposited in the heart-wood of most trees, there is always more or less crude sap present, and often other substances, which seem to hasten the decay of the wood. The removal of these is the object of the process called seasoning. There are three ways of seasoning timber in common use. The first is by exposing it the action of the sun and atmosphere. In this way the deleterious substances are removed by evaporation. As these substances, when present, must of course occupy some space in the wood, their removal diminishes its size. If they be removed more rapidly from one side of a plank, or stick of timber, than from the other, the contraction of the two sides must proceed at unequal rates. The effect of this is to curl or warp the piece. On this account, it is advisable to season planks by the action of the atmosphere alone, without exposing them to the direct action of the sun, as it is next to impossible to have the sun act equally on both sides. Our most experienced engineers and builders advise that, in seasoning timber, it should be loosely piled up, so that the atmosphere may have free access to it on every side, and that it be kept under cover thoughout the whole process. A second way of seasoning is to expose the timber to artificial heat in kilns. This process is in theory the same as the first. The only things to be attended to in adopting this method are, to place the timber in such a way that all the parts of the same piece shall be exposed to about the same temperature; and to so regulate that temperature as not to char the wood. A third way is to immerse the timber in water. By this method we wash the injurious substances out of the wood, instead of drying them out. The vessels of wood, will of course, by this process, become filled with water; but water evaporates so much more easily than the substances with which the vessels of the wood are naturally filled, that after the latter have been washed out, the former will evaporate in the course of a few days. From the manner in which water operates in seasoning timber, the reason why a running stream is preferable to stagnant water for this purpose, will be at once evident. Fresh water is also better than salt, because although the latter will wash the wood as clean as the former, yet when it is itself removed by evaporation, its water only evaporates, whilst the salt which it contained is left behind. Salt being a diliquescent substance, attracts moisture from the atmosphere, and in this way the wood is kept continually more or less wet, to its great detriment as timber.

Chap. VI.

BARK OF EXOGENS. LIBER. CORTICAL INTEGUMENT. ENDOGENS. AGE AND SIZE OF TREES. ACROGENS.

The third and uttermost portion of the stem is the bark. This consists of two distinct portions; an inner fibrous portion, termed the liber, and an outer cellular portion, termed the corticle integument. The liber of some plants is remarkable for its susceptibility of being split into very thin layers, which are tough enough to be employed in the manufacture of twine and cordage. It is from the liber of a species of lime tree, (*tilia,*) that Russian matting is made. In the Sandwich Islands, a species of cloth is manufactured from the liber of a tree common in those islands. In ancient times, the liber of some trees was stripped into layers, flattened, cemented into leaves, and used as a material to write upon, instead of paper or parchment. At the present day, a very good species of paper is made from the same material as the Sandwich Island cloth, and is used in those islands, both for writing and printing upon. The liber of very many of our common trees can be made into paper. Some years since, a German paper-maker, presented to one of the scientific associations of Europe, a treatise on his art, written upon upwards of thirty different kinds of paper, made from the liber of as many different kinds of trees, all of which were indigenous of Germany. The woody fibre of the hemp (*cannabis sativa,*) and flax, (*linum asitatissimum,*) so extensively used in the arts, belongs to the liber, and not to the woody portion of the stems of those plants.

The bark increases in thickness, by the deposition of a new layer every year, between the original bark and the wood; each new layer being formed in a manner precisely similar to the first, with this exception, that the cellular or spongy part, being excluded from the air and light, does not become green, as in the first instance. That a new layer is added to the bark internally, each year, Du Hamel has proved by a very simple experiment. He passed a metallic thread under the innermost layer of the liber of a young tree, and left

it undisturbed for several years. On cutting across the bark afterwards, the thread was found to have been pushed outwards by the deposition, between itself and the wood, of new layers, corresponding in number to the years which had elapsed since its introduction. As the bark increases by the addition of a new layer annually, it would seem, that the age of a tree might be determined by counting these layers, as well as those of the wood. This can be done in the case of young trees, whose bark remains entire, but not in the case of an old tree; for as a tree increases in age, the outermost and oldest layers are torn by the continual distention of the growing stem, and becoming dead matter, finally fall away.

The duration of the bark varies in different trees. In the white-oak, (*quercus alba,*) and many other trees, it breaks into deep longitudinal fissures, as the stem increases in size. The separate portions into which it is thus divided often attain the thickness of half an inch or more. On the other hand, a great part of the bark of the sycamore (*plantanus occidentalis,*) falls off every year, in the form of brittle plants. In the white-birch, (*betula populifolia,*) it separates into their membranous layers, which tear into separate pieces, and gradually curl up, until they curl off. The difference observable in the manner in which the bark of different trees is rent, arises from a difference in the manner in which the woody fibre is disposed in it. In some plants these fibres are disposed perfectly parallel to each other; in others, they cross each other at certain angles. In the celebrated lace-bark tree of Jamaica, they "are numerous, quite white, extremely fine, and when stretched out, open into a kind of delicate net-work resembling lace."

The bark is obviously intended for the protection of the young wood which is formed beneath it. It is also the medium through which the juices of a plant, after their elaboration in the leaves, descend, and are transmitted to the wood. Hence, the bark is absolutely essential to the life of exogenous plants; and there is no more effectual way of killing them than by removing a section of it all the way around the stem; or girdling them, as it is commonly called. In trees where the fibres lie parallel to each other, or nearly so, the bark may be cut perpendicularly, not only without injuring the tree, but often with decided advantage; inasmuch as the vessels of the new wood, or alburnum, are in this way enabled to circulate the sap more freely. In herbs, and in the young branches of trees where the bark is green and succulent, it performs the same functions as the leaves, and supplies their place, whenever, as in the cactuses, true leaves are wanting.

Endogenous stems differ very much from exogenous ones in their structure. The characteristic differences, as I have already mentioned when defining these terms, are the arrangement of the tissues, and the manner of their growth. Besides this, endogens differ from exogens, in having neither pith, medullary rays, bark, or wood, properly so called, but consisting of a confused mass of woody bundles, imbeded in cellular tissue. In the stalk of the corn, (*zea mays,*) which affords a good specimen of a stem constructed on the endogenous plan, we find an external cortical integument, without liber, and bundles of woody matter, so arranged throughout the cellular tissue, as to be much more numerous and compact at the circumference, than towards the centre. In the stem of the garden-asparagus, (*asparagus officinalis,*) the woody bundles are distributed uniformly, throughout the stem, and so soft as scarcely to be recognized as woody matter. The same arrangement of the woody bundles exists in the green-brier, (*smilax rotudifolia,*) the only endogenous shrub common in Virginia. In the stems of grasses, which have been said to be "the least endogenous of all endogenous stems," the structure is so modified as not to be at once evident. The peculiarity of these stems is, that they are hollow, except at their nodes or joints, which are very compact discs, closing the stem entirely. They are, however, in every instance, at first solid, and become hollow in the course of their growth. In other respects, the stems of grasses present no variation from the typical structure of endogens.

The slender fibres which appear in endogenous stems, consist of ducts, spiral vessels, and woody fibre, and may be traced as unbroken threads from the base of the leaves throughout the whole length of the stem to the extremities of the roots. Stems of this structure increase in solidity by the annual addition of new woody bundles, within and among those already formed. From this peculiarity in the mode of their growth, they have received the name of endogens, or growers inwardly. In these stems, the older portions of wood are found next the circumference, whilst the newer and softer portions lie next the centre. This furnishes a good characteristic for distinguishing them from exogens, in which the newly formed and softer portions are necessarily next the circumference.

There is no provision made for the growth of the rind of endogens, like that for the bark of exogens; it is, however, capable of distention to a certain extent whilst green; but when it once hardens, the stem can increase in diameter no longer. The horizontal growth of endogenous plants is therefore limited, except in those rare instances in which the rind remains soft and capable of indefinite distention. Endogenous stems having grown in a horizontal direction for a certain time with great rapidity, do not afterwards increase in diameter at all. The trunks of palms, and the stems of herbaceous endogens also, such as that of the asparagus, are almost as large when they first appear, as at any subsequent period of their growth. Ligatures, or the firm embrace of twining plants, by preventing further increase in diameter, soon destroy the life of exogens, whilst they do not affect the growth of endogens at all. The external structure of endogens furnishes no means by which their age can be ascertained. It has been said, that in palms, the external rings, indicating the situation of the leaves, coincide in number with the years which the individual has lived. Little dependence, however, can be placed upon this circumstance; for in many palms these rings have been noticed to disappear after a term of years; and besides, it is far from being certain that only a single ring results from each year's growth in these plants.

The life of endogens, as well as their increase in diameter, is limited by the nature of their rind. When the lateral growth of the stem has proceeded to a certain extent, the rind hardens, and the stem being in this way prevented from increasing in diameter, can only grow in length; and as the

consequence, stems of this character are generally slender. The continual disposition of new bundles of woody matter, within the unyielding rind, finally produces a total solidification of the stem, and death follows as a necessary consequence. Thus the life of an endogenous stem is limited; for, unless destroyed by some external agency, it must die of old age. The individual, however, is seldom destroyed; for whilst the trunk is thus slowly perishing, the great accumulation of sap in the roots, causes the developement of new shoots from the base of the stem, and these continue the life of the individual when the original trunk dies down to the ground. In this view, the life of endogenous trees is unlimited.

In the structure of exogenous stems, on the other hand, there is nothing to limit either their increase or duration; they never die purely of old age, but when destroyed, are destroyed by some external agency. The central wood of exogens it is true, dies in the course of time, but the death of the stem does not follow as a consequence of this; for nothing is more common than to see a tree hollow, destroyed at its centre, whilst it is growing vigorously at its circumference. The sycamore (*plantanus occidentalis*) furnishes a remarkable and well known illustration of this. The oldest trunks are generally all destroyed, excepting a few of the outer and recently formed layers, which prolong the existence of the individual.

Some instances of great size, and extreme longevity in exogenous trees, where the statement can be relied upon, may not be uninteresting. The *pinus lambartiana*, a species of pine indigenous to northern California, probably attains a greater size than any other known tree. One specimen, measured by Mr. Douglas, an English botanist, "was 215 feet in height, 57 feet 9 inches in circumference, at a distance of three feet from the ground, and 17 feet 5 inches, at 134 feet; thus giving as the solid contents of the trunk alone about 1200 cubic feet. This was probably, the largest single mass of timber ever measured by man."—"A sycamore growing near Marietta, Ohio, measures 15½ feet in diameter;" or supposing it cylyndrical, more than 45 feet in circumference. There is said to be "an oriental sycamore, growing near Constantinople, 150 feet in circumference, with an internal cavity of 80 feet." "The largest oak known in England, was called Damony's oak, in Dorsetshire, and was 68 feet in circumference. With respect to the age of trees, it may be remarked, that an elm has been to reach the age of 335 years, an ivy 450, an orange 630, an olive about 700, a cedar of Lebanon 800, a white-oak 1080, and a yew between 13 and 1400. De Candolle estimates the age of a Mexican cypress at 6000 years; but then his estimate was formed by dividing the semi-diameter of the trunk, by the average thickness of the layers of that species of tree, and for reasons before mentioned cannot be relied upon. If it were indeed so old, its young shoot, must have been watered by the waves of the deluge. The most aged, as well as the largest trees, in the northern parts of the United States, belong to the species *plantanus occidentalis* American plane-tree, as it is called in Europe, or butter-ball, as it is called in New England, or sycamore as it is more commonly called in the western and southern states. The largest and most aged trees, indigenous to the southern states, belong to the species *cupressus thyoides*, white cedar as it called in New England, or cypress as it is more commonly called at the south.

If we compare an exogenous with an endogenous stem, we are, at first sight, unable to discover any analogy between them; but on a more careful inspection, we will find that the principal difference in the arrangement of their materials consist in this: that in the former, the woody fibres and vessels, are disposed throughout the cellular portion of the stem, in the form of concentric zones, irregularly intersected by the medullary rays; whilst in the latter, they are arranged as bundles, irregularly placed throughout the stem. If we examine a transverse section of one of the bundles, with a good microscope, we will find it to be concavo-convex, with its convexity turned towards the outside of the stem. The convex or outer side, will be found uniformly more solid than the concave or inner side. Now if we suppose the medullary rays to be continuous throughout the length of the stem, they must cut the zones of an exogen up into bundles, very similar to those of an endogen. The medullary rays in an exogen, are but parts of the pith, consisting like that of cellular tissue only, and owing their peculiar flattened appearance, to the extreme pressure to which they are subjected by the growing wood. If in consequence of the wood's being more loosely arranged, this pressure was removed; their cellules would have the same form as those of the pith; indeed, the two would be undistinguishably blended together; and thus an exogen would assume very nearly the appearance of an endogen. We do not mean to make the impression, that these changes ever do take place; but only by supposing them, to point out more distinctly the resemblance which these two kinds of stems have to each other.

Besides these two kinds of stems, which are by far the most common, there is a third kind, met with only in ferns, and a few other closely allied genera of plants. In its general arrangement it resembles the endogenous method, but differs from it in this, that the woody bundles instead of presenting, on a transverse section, a circular or crescent shaped figure, appear "like a number of sinuous lines, doubling about among spongy matter." These bundles never increase in thickness, number or quantity, after being once formed, and of course this class of stems do not increase in diameter at all, but are able to lengthen only by the addition of new matter to their extremities. Hence, they have been termed acrogens. As this structure is very uncommon, and but little understood, in such an essay as the present it cannot claim more than this passing notice.

(To be continued.)

GREAT CROPS OF WHEAT IN NEW HAMPSHIRE.

Josiah Stevens, Esq., of New Hampshire, Secretary of State, raised last season on one acre of light soil upon his farm in Newport, very near thirty bushels of the common bearded wheat. He sowed upon this acre four bushels of dry slacked lime made at Wethersfield, Vt. Mr. Stevens is of opinion that his crop of wheat was doubled in consequence of the application of the lime. One bushel and a half of seed was sowed.—[*Mon. Vis.*

SALE OF DURHAM SHORT-CORN COWS.

The following are the names and prices of short-horn cows, recently imported from England, and sold near Philadelphia, in November.

Dairy Maid, calved in 1835, sold for	$540
Victoria, 1835 - - - - -	520
Viviana, 1835 - - - - -	530
Thornville. 1835 - - - - -	500
Lobelia, 1836 - - - - -	400
Enchantress, 1836 - - - -	500
Minerva, 1836 - - - - -	360
Sarah, 1836 - - - - -	380

Two were brought to Virginia, and therefore, their pedigrees also will be given.

Hunnia, roan, calved June, 1835, by Bywell, dam by a son of Wellington, 683, g. d. a very good cow. The breeder was very particular in the selection of his bulls; though he paid no regard to pedigree, he nevertheless took as much pains as any breeder of the present day Bywell, by Marlish, dam by the Warless Duke of Wellington, 231, g. d. by Sir Harry, 1444. Should calve to a bull bred by Sir Charles Lorain—sold for $500 to Corbin Warwick, Esq.

Lady Whitworth, dark roan, calved in 1836, by Mr. Hudspith's celebrated roan bull, and he was by Mr. Snowball's Wharmsley, dam by Mr. Coate's Exmouth, g. d. by Warless Duke of Wellington, 231. Lady Whitworth's dam, bred by Mr. Connel, of New Laith's Hall, by Cumberland. Exmouth, by Wellington, 683. Cumberland, by Phenomenon, 491, dam by Colonel, 152, g. d. by a son of Hubback. Should calve in February next to Edmund—sold for $530 to J. M. Warwick, Esq.

For the Farmers' Register.

IS THE PLANET WHICH WE INHABIT BECOMING COLDER?

An opinion prevails extensively, I find, among the philosophers of the present day, that this earthly habitation of ours is becoming constantly colder and colder, and that this has been the case ever since the creation. This opinion is founded upon a certain philiosophical theory, which theory is founded on certain geological facts which the diligence of modern research has brought to light. I do not mean to say any thing of those facts, or of the theory founded on them. I mean only to inquire what evidence we have from history that the earth is becoming colder and colder. And even this inquiry I should not consider as very suitable for an agricultural publication, were it not that some efforts have been made to diffuse the opinion, I have mentioned, among agriculturists. They are told that the earth is becoming colder and colder; that this results from an invariable law of nature; that this process has been going on from the creation to the present hour, and must continue to go on until the earth becomes too cold for animal and vegetable life; that this cooling process has gone on so rapidly in the last half century that it is clearly perceivable by the old and middle aged inhabitants of our country now living; that the middle states are becoming too cold for the production of wheat; that the cultivation of that article must soon become the employment of the people of the southern states, and the cultivation of cotton must, about the same time, take up its residence within the tropics; and the end of the process must be that poor old Virginia will become a land of perpetual snow and ice.

These are gloomy prospects. Such anticipations are very discouraging, and have a tendency to paralyse the efforts of the farmer. I would say to him, on the contrary, cheer up! Be not discouraged. Whatever philosophers may tell you about the dissipation of the internal heat of the earth, or whatever you may believe on the subject, be not discouraged. There is a "more sure word of prophecy to which you would do well to attend." It is in the following words, viz: "While the earth remaineth, seed time and harvest, and cold and heat, and summer and winter, and day and night shall not cease." (Gen. viii. 22.) That prophecy has been fulfilled to the latter, more than four thousand years, and it certainly requires no great stretch of faith to belive that it may be fulfilled during four thousand years to come. But let us proceed, at once, to consider the question we propose to discuss, viz: Is there any evidence in history which ought to induce us to belive that the earth was warmer in ancient than we find it to be in modern times? The most ancient, as well as the most authentic history which has come down to modern times, is contained in the scriptures of the Old Testament. These scriptures were written chiefly in Palestine; the prophecies of Daniel, perhaps, in Babylon, and the Book of Job in Arabia; but they all relate almost entirely to the countries of Palestine, Egypt, Arabia, Syria, and Mesopotamia. Within the last hundred years, numerous travellers from Europe have traversed all those countries, and of late years, a considerable number from the United States. Does it not appear evidently from their descriptions of the habits, the buildings, the productions, and the climate of those countries, that they now have the same temperature they had in the days of the patriarchs, 3500 or 4000 years ago? Did it ever occur to any one who had read the scriptures of the Old Testament and the accounts written by modern travellers of the countries just mentioned, that the climate of those countries is in modern times materially variant from what it was in ancient days? But let us descend a little to particulars. When the patriarch Jacob, who lived about 1700 years before the christian era, was overtaken by his father-in-law, Laban, among other severe things which he said to him, were the following: "This twenty years have I been with thee, ***** *****, in the day the drought consumed me, and the frost by night, *****, surely thou wouldst now have sent me away empty." Jacob had kept Laban's flocks in the plains of the Euphrates. Would any shepherd of modern times complain more bitterly of the frost of that country than Jacob did? The book of Job furnishes us with additional evidence on this subject. It is agreed, I believe, on all hands, that this book was written, or at least, that the events which it narrates took place, about 1500 years before the christian era, and it is also, I believe, universally agreed the land of Uz, where Job dwelt, lay in Arabia to the south or south-east of Palestine. Arabia is well known to be, at the present day, a very hot country, yet Job speaks of cold, frost and snow, as things well known there in his day. There is one passage a

good deal remarkable. "By the breath of God frost is given, and the breadth of the waters is straitened." (Job 37. 10.) It appears from this, that in Job's time the freezing, in his part of Arabia, was sometimes so considerable that the edges of the streams were so frozen as to contract their channels. I much doubt whether there is cold much more intense than this, even at the present day. But in the chapter immediately followimg that from which the last quotation is taken, a degree of cold still more intense is spoken of. "Out of whose womb came the ice? and the hoary frost of Heaven, who hath gendered it? The waters are hid as with a *stone*, and the face of the deep is frozen." (Job 38. 29, 30.] Although the two verses last quoted are introduced as spoken by the Almighty himself, and may therefore, be supposed to refer to other countries than that of Arabia, yet the Almighty speaks to Job, as of things with which Job himself was acquainted. It is not necessary here to discuss the question whether the book of Job be a real history, or a fictitious poem, or extended poetical parable. It suits my purpose equally on either supposition. If we refer to the book of Psalms and to the prophets we shall find cold and snow frequently mentioned. When any thing is spoken of as exceedingly white, it is compared to snow; "as white as snow." Sometimes things are said to be as white as wool. But wool in a tropical climate ceases to be wool, and becomes hair. If we inquire into the mode of living of the ancient inhabitants of Palestine, we find that was the same thousands of years ago that it is now. They were in very early times chiefly a pastoral people; as population increased they became more agricultural. In their pastoral state they had herds of cattle, and flocks of sheep, and goats. Are these animals which indicate a climate much warmer than that of Palestine at the present day? But when the people of Palestine, or a portion of them, became agriculturists what grains did they cultivate? We find it was barley and wheat. Boaz, who seems to have farmed extensively, and lived about years before Christ, cultivated barley and wheat. Are those grains suited to a climate much warmer than Palestine is in our day? But if we refer to the Greek historians, as Herodotus, Xenophon, Thucydides, &c., do we find in them any thing which would lead us to believe that the temperature of the countries of which they treat was warmer in ancient times than it is at present? But if we come down to the history of Rome, what do we there find on this subject? From whence did Rome obtain her wheat? Was it not from Sicily, from Egypt, and from the countries now called the Barbary states? But if we come down to modern times what do we find to have been the progress of agriculture? We find the culture of wheat has been gradually extending in Europe, from south to north, not from north to south as certain philosophic theories would lead us to believe. When Marshall, the agricultural tourist, travelled through some of the northern countries, he found, if I remember right, very little wheat in the northern parts of Germany, in Denmark and Sweden. The culture of that grain has been, almost ever since, gradually extending farther and farther north. It is well known that, within the last half century, the cultivation of wheat has been rapidly extending northward in England and Scotland. If the temperature of our world has changed, I think, so far as history goes, we might be justifiable in asserting that the temperature of the world is becoming warmer. I remember to have seen a book between 45 and 50 years ago, written expressly to maintain this opinion. The author adduced a great many facts in support of his position, all of which I have forgotten except two. One of those facts was, that we have accounts in ancient history, of armies being stopped in their march by great falls of snow in countries where, in modern times, snow never falls in quantities sufficient to produce such an effect. The other fact was that, in ancient times, the rein-deer were inhabitants of the Black Forest in Germany; but the climate becoming too warm for them they retreated to the northern parts of Germany; but that country becoming too warm they retreated to Lapland, and spreading themselves around the northern end of Europe, found a country whose climate, as yet, is sufficiently cold for their comfort. How far those alledged facts can be supported by history I do not undertake to say; but I do say that I know of no historical facts which lead me to believe, or even suspect, that the temperature of our earth is colder now than it was as far back as history extends. For a few years past, we have had, in the United States, winters very unfavorable to the growth of wheat. But this did not arise so much from the coldness of the winters as from their peculiar character—little snow, and a succession of freezings and thawings. If we had had snow as in former times, our wheat would not have frozen out. SENEX.

From the Genesee Farmer.

IMPROVED BREEDS OF SWINE.

The production of pork is one of the most valuable and important staples of the farmers of the United States: and the swine of our country are scarcely second in value, as farm-stock, to the entire amount of its neat cattle. Besides converting the offal and coarser and less valuable of the farm products into a marketable commodity in the feeding of swine, the richest and most luxuriant grain of the country is usually devoted to their preparation for market; and throughout the whole interior, in the pork-crop of the farmer is combined the surplus of his root cultivation, and the net proceeds of his coarser grains: the gross result of all depending on the final proceeds of his pork account.

This is a very important matter for the farmer. The entire *modus operandi* of rural economy is more or less concerned in a subject so interesting in its results of profit or of loss; and is entitled, I fancy, to infinitely more consideration than is usually bestowed upon it.

With most of our farmers, even at the present day, particularly in the western country, among that numerous and wide-spread class whose principal dependence is on their pork crop for reward, a hog is simply a hog—the name comprising all of excellence in the animal necessary to produce the article of pork required. The *brute* in question, for it deserves no softer name, is indigenous to the country. It exists in the streets of our cities, in the highways of our ordinary farming districts, and in the forests of the west and south—and in

every corn-field and potato ground too, of the regions which they inhabit at all, provided the fences enclosing them to be not remarkably close and of an extraordinary height. Their cheif excellencies are, the possession of a surpassingly active and vigorous lever power in the poll and snout, acting by an ingenious co-operation of the spinal and nasal muscles; a celerity of speed, equalled only by the fox, or the hound, in a chase; and an indomitable propensity to all evil, conclusively illustrative of their lineage from a conspicious race of scripture date. And this is the material from which is produced, in more than three-fourths of the United States, and indeed in almost the entire continent of America, the vast supplies of pork which are annually sold, purchased and consumed in the land!

Important improvements, and wonderful changes, have been introduced in most of our breeds of domestic animals and farming stock; but less in our swine than in any other. Why this universal neglect in the improvement of an animal furnishing us with our richest meats, and adapted to consume, in the most profitable manner, not only to the farmer, but to the common house-keeper the offal of both the harvest and the kitchen, is, not easy of answer, unless it be that its remarkable propensities of shifting for itself in its semi-savage condition, render it more acceptable to those who consider that every thing pillaged from their neighbors, or from the public, is so much direct benefit to themselves. This perhaps, is an uncharitable solution of the problem; but I feelingly appeal to those who, having a due regard to neighborhood comfort, and to individual right, if any other reason will account for the legions of miserable, starved, and mischievious brutes running at large, disgracing the name of even a—hog, and infesting almost the entire land.

Nor are the characteristics above named, the only objections to the common swine of our country. They are huge and gross feeders; equally gluttonous in offensive animal offal, even to carrion, as in vegetable food and grains. Measured by well chosen and approved physiological rules, and none other will or can be admitted by true economy, utility, or common sense, the animal in question will be found utterly inadequate in comparison, to the main purposes of the farmer or house-keeper for profit. From fifty to one hundred per cent. more food, as the case may be, is required to make a given quantity of pork of interior quality, both in taste, and marketable varieties, from the common hog, than is required in the improved breeds of our swine. This fact has been so often demonstrated, that it needs no further confirmation, as all those who are conversant with the subject will readily testify. My own experience for many years, is satisfactory on this point, and with all intelligent men, and practical farmers, no doubt exists upon the subject.

Within the last three or four years, the public attention has become much awakened to the necessity of a reform in this important branch of agriculture, and following the rapid spirit of improvement in our neat stock by the importation of many valuable breeds of short-horn cattle from abroad, and their dissemination throughout our country, the better and more approved breeds of swine have been eagerly sought after, and to a considerable extent introduced into many sections of the union. Among our truly intelligent and thriftly farmers, the spirit of acquisition in all *improved* breeds of animals was never so active, and I imagine that it only needs the dissemination of fact and information among them, to draw their attention yet more closely to it.

So important does the question of a thorough improvement in the swine of the United States appear, as connected with not only the quality of our pork, but as a means of the absolute saving of hundreds of thousands, if not millions, of dollars annually to our farmers, that, since I have commenced the subject, I feel disposed, even at the expense of prolixity, to speak of some of our most approved breeds of swine; yet I shall discourse of nothing but such as I know and have tried by actual demonstrations, and such as I can with entire confidence declare to be worthy of attention.

As first among the most desirable breeds, I name the improved Chinese. These animals *in their purity*, are exceedingly scarce in the country. They may exist in several parts of the United States, but I know of them now at only one farm in this region. I first purchased a pair of Caleb N. Bement, Esq. at Albany, in the fall of 1833, he having obtained them of Mr. Dunn of that city, who many years before, procured the breed from New Jersey. At the time I purchased these of Mr. Bemant, he had many others of the kind, and I then thought, as the fact has since proved, that he placed altogether too low an estimate on their value as an *original stock* for the improvement of other breeds. That gentleman has for some years past, I believe, been entirely out of the breed, having turned his attention almost exclusively to the breeding of Berkshires.

The principal and most important characteristics of this breed are, their exceeding quietness of disposition and habit; round and perfect proportions; tolerable length of body; delicacy of bone and limb; smallness of head, legs and feet; lighter in the offal parts than any other breed whatsoever; and a propensity to take on fat to a greater extent with less food than probably any other animal in existence. They are in fact the *beau ideal* of hogs! In size they are only middling, weighing at nine months old from 180 to 200; and at fifteen to eighteen months, 250 to 400 pounds; depending much upon their previous keep and fattening. Of the original pair which I purchased, the sow still survives, a good breeder, weighing in fair condition about 200 pounds. The boar at the age of four years, was overgrown with fat, and useless, although kept only on grass in summer and with low food in winter. He died when five years old, and his usual weight was about 400 lbs. One of their decendants is now four years old past, and has arrived at the same condition, being useless for breeding purposes. Numbers of their progeny have been scattered far and wide over the country. I bred many of them on my own farm, but the calls were too incessant for me to part with them, and not being conveniently located for their distribution, I parted with nearly my entire stock a year or two since, to Mr. A. B. Allen, who has bred them extensively for sale on his farm on the Niagara River, two miles below Black Rock. I have fatted many of this breed, mostly mixed with English blood, and a few full blood, and I never made pork with

equal economy, and of such perfect qualitity as from these. It is the breed slightly mixed with some other, that I would always select for the purposes of my own farm, and I feel warranted in saying, without fear of contradiction, that a cross of the China is the most valuable of any other in the country for economical pork-making.

With all their perfections they are objected to by some; and entire frankness in the matter demands that their objections should be noticed. The first of these is, their want of size. That has been already stated. It is not an objection in my view. If they had longer legs, which would spoil them, this objection would not be so apparent. Others object to their lack of hardihood and want of constitution. If an entire absence of hog-like ferocity, and the greatest amenity of disposition of which the animal is susceptible, together with the love of a warm and snug shelter in the inclement season, instead of a wild burrow in a fallen tree tob, or an ability to *burglar* itself into luxury at any sacrifice to its owner or his neighbor, be faults, then truly have the China pigs most grievous ones; for they love a shelter and a home in winter; and it is dangerous to life for their young to come into this breathing world in very cold weather—the first of April to the first of May being early enough for a litter of full bred China pigs to see the light. I know of no other vices with which they may be charged, unless it be *the lack of bristles*, and a total aversion to run, or to jump a fence, even two feet high, or to be rapidly driven. The sows are universally good and careful nurses, having from six to nine pigs, rarely ten at a birth; which, if decently fed, they raise with abundant ease. Indeed, I know of no *fault* with the *pure improved China hog:* and still I consider them with all their good qualities, in their purity, not exactly the animal for the pork-making farmer. Were I to direct him what to do to raise his breed of hogs to the greatest pitch of excellence, I would say—no matter what his breed may now be, if not of the approved varieties—in the northern states, where his stock is fed in pens, with ground or cooked food—"Cross your stock with China, and keep crossing it, no matter how high, until they fail in size or vigor, and then go to the Berkshire or something else; but still let the main ingredient of the animal be China blood." The continual tendency of hogs, as of most other animals is, without great care, to deteriorate; to grow coarse and wasty; and I know of no cross which so readily brings them back into snug and correct proportions as the China.

I have had various crosses of these upon other breeds of swine, and I have never known an instance where they were not improved by the China blood. The size of the crossed China is large; frequently double that of the pure blood, varying from three to four hundred pounds at eighteen months old, and *always* excellent. Even in the first cross upon the wild-woods hog, the produce is astonishingly altered, and the second makes an admirable animal, with great constitution and hardihood, accompanied by the quiet disposition and fattening propensities of the parent China. More need not be said in praise of the China hog. Since I first obtained them, by judicious selections, they have been continually improving in their appearance and good qualities; and I fearlessly challenge the country for finer specimens of Chinese swine than can be shown from my former stock, now at Mr. A.'s farm.

If I have placed the China pig *first* in estimation, it is because I think him better fitted than any other to *improve*, as a first cross, the condition of our country swine generally; but for some purposes and in the opinion of many of our farmers, particularly the large grazing and pork feeders of the west, the Berkshire hog possesses properties of far greater attraction. In the description of this animal, I shall claim for him no refinement of character, or particular placidity of temper; for, so far as I have been acquainted, he is as much of a hog as any other variety within my knowledge. These have been so often and so well described and figured in the agricultural papers by my friend BEMENT, of Albany, who has a large herd of them, that my account will be a short one. Their main properties are, larger size, weighing from three to five hundred pounds at eighteen months and two years old; and at a much earlier age I should not think they would so profitably fatten; great vigor, constitution, and muscular action; but withal, an apitude and quickness to fatten rarely equalled in most other large breeds; extraordinary length of body; breadth of carcass; light offal; large, well shaped ham; and in fine an excellent pork-hog. They are a darker spotted than the China, being in most cases nearly black, but without bristles, or with very slight ones. The sows are prolific breeders, having from eight to fifteen pigs at a birth. They have the usually ravenous disposition and character of the common hog, sometimes devouring not only their own young, but whatever other feeble and inoffensive small animals may come within their reach. They are good nurses, and a sucking Berkshire pig can rarely be excelled in beauty by any creature of the kind. They are strong, and coarse feeders; exceedingly hardy; good travellers (a desirable quality for the western country, where the farmer drives his fat hogs to market instead of butchering them at home;) are remarkably well calculated to follow fattening cattle through the corn-fields, and to thrive on roots and coarse grains. They have obtained extensive celebrity on account of their great size, and other good qualities, and are, beyond question, with those who desire *extraordinary large*, as well as fine animals, the best *pure blooded* swine in the country. They have an increasing popularity; are sold in many instances at enormous prices, and will probably be multiplied, as they ought to be, throughout the United States.

Yet good as are these animals, they can be much improved by a cross of the China. They are antipodes in character and disposition; but each possessing excellencies of a peculiar and desirable kind, and when mingled with a cross of the Berkshire boar and China sow, the produce is the most perfect that the swine family, numerous as it is, can boast. I have had them, and have seen them elsewhere extensively crossed, and always with entire success. To the China is added, size, vigor, hardihood, and length of carcass; and to the Berkshire, docility, quietude of habit and disposition, delicacy of bone, limb and muscle, and a remarkable propensity to fatten—in fine, the best hog in the world! I never have yet witnessed such beautiful specimens of the swine

family, as those of the Berkshire and China cross. When once made it may be followed upon either side, according to the fancy of the breeder; but let the cross be made either way, it cannot be amiss. I would therefore say to the farmer, if you would have the finest of hogs and the best quality of pork, procure both the China and the Berkshire, and you can never be at fault in possessing a perfect breed.

There is still another variety of swine which exists in this neighborhood, and which I deem too valuable to omit a passing notice of, while discussing this important matter. The origin is partly owing to accident, and partly to my own love of innovating, as they were first produced upon my own farm, and have since been so successfully bred and substantiated as to claim the merit of a distinct variety. They originated from a cross with a most valuable large white English breed, and the improved China. They were bred several years on my own farm, where some of them now remain, but they are principally kept as breeding stock, together with the China and Berkshire varieties, by Mr. A. B. Allen. He has given them the appropriate name of the Tuscarorars, and by a careful and judicious system of selections and breeding, he has brought them to great perfection. They combine in all their particulars, except in delicay and firmness of bone, the good qualities of the China. They are longer bodied, nearly double their size, yet smaller considerably than the Berkshire, and will weigh 300 to 500 lbs. at eighteen months old. They fatten equally as well when six or nine months old as the China, are lighter colored, being usually light spotted, the white predominating. They have the tranquil pleasant habits of the Chinese, without the uneasy, predatory propensities of the Berkshires, and are in all particulars just what the farmer of our northern and middle states would desire for a good stock and pork-hog.

In fine, I do not know that I can better conclude this long story, than by saying, that in small and delicate breeds the China is the most perfect; in the large and grosser sorts, the Berkshire is decidedly preferable; but, for a *good, honest, quiet, every-day hog*, the Tuscarora is, after all, equal, if not superior to either. At any rate, if you possess nothing but the common breed, try one or all of these, and you cannot but be essentially benefited. A notice of other varieties must be left for a future paper. ULMUS.

REMARKS ON WINE-MAKING.

To the Editor of the Farmers' Register.

Vicksburg, Mi., Feb. 11, 1839.

I perceive, in your last number, a notice of a secret method of making wine from the grape in the short space of six days. The subject of wine-making has occupied a good deal of my attention for several years past, and the article you have copied struck me with a great deal of force; not merely from the magnitude of its importance, great as it is, but from having had my own thoughts turned to that particular object for some time past. There are two principal operations which wine must undergo in order to perfect itself: firstly, fermentation, which is not generally completed under a year; and secondly, the deposition of the tartaric acid which it holds in solution, and which requires, in most wines, several years to accomplish fully. Corn and rye are made to develope the alcoholic principle perfectly in three days; and I think there is no doubt but that the juice of the grape may, by the addition of yeast, be forced to perform the operation in the same time. But it was a doubtful question with me, whether so rapid a fermentation would not cause a greater loss of alcohol, as a consequence of the greater degree of heat which would be excited. This question, however, is settled by Mr. Da Costa, for most unquestionably, this is a part of his secret; as the fermentation must be perfected before the wine is perfect. To dispose of the tartaric acid, however, was with me the greatest difficulty. I know of no means to hasten the deposition; and the only mode left was to neutralize it with an alkali; but whether this could be done without injury to the wine, was another doubtful question, and a question which I conceive Mr. Da Costa has settled. Here then, I presume, lies the secret of making wine in six days.

If this be the process of making new wine, then the renovation of inferior wine is simple and easy. Such wine has lost its alcoholic principle, or the greatest portion of it. All that would be necessary would be to add, say half a pound of sugar to the gallon, give it a gentle heat, and with yeast renew the fermentation; then treat it as new wine.

None of the treatises which I have seen on the subject of wine-making, attempt to give an estimate of the amount of alcohol dissolved in, and carried off by, the carbonic acid gas; but the statements of various writers show that it is considerable; and it is evident that the quantity lost must be in proportion to the heat generated, and the heat will be in proportion to the rapidity of the fermentation.

My object in writing this, is neither to come into competition with Mr. Da Costa, nor to worm out his secret; but it is to call your attention, not to this point particularly, but to the subject of wine-making generally. You have heretofore satisfied your conscience by giving publicity to such communications as were sent to you, and the extraction of a few articles from other periodicals.* If you look through the world, you will find that wherever the vine is capable of being cultivated, wine is one of the great staples of every country except our own, and it is certainly worthy of very serious inquiry why this country should form an exception to so general a rule. It cannot be the difference in the value of labor, for that difference is more than made up in the relative value of land and the taxes. Chaptal gives the medium value of land in the district of Champaigne at about one thousand dollars an acre, (English measure) and the taxes upon the produce at twenty-three dollars, making upwards of fifty dollars for the two items of rent and taxes. The value of the crop, he states at twenty cents the gallon. I have had several laborers with me, from the vineyards of Germany and France, who concur in saying that

* We do not admit the justice of this charge. Our correspondent was not a subscriber to the first three volumes of this journal, or he would have seen that as much attention has been paid to the subject of vine-culture and wine-making as could have been expected under the existing circumstances.—ED. F. R.

if they get one good crop in five years they are satisfied. Great as are the complaints respecting the rot in this country, I doubt not that our crops will average as much as those of Europe. Much labor and time have been devoted by yourself and others to the subject of silk and beet-root-culture; but I am certain that a few hours of research and reflection will convince you of the greater importance of vine-culture in the amount of profitable employment it will give to the country.

Among the cultivators of the vine in South Carolina, can you not find a successor to Mr. Herbemont, of equal learning, equal urbanity, and equal veracity? A SUBSCRIBER.

A PROFITABLE MODE OF CULTIVATING CORN. BADEN CORN.

To the Editor of the Farmers' Register.

Wigwam, Amelia, March 8, 1839.

Permit me through the columns of your journal, to recommend a mode of cultivating corn, which has been successfully pursued by a friend of mine, for the last 20 years, and which seems to me to be founded on reason. The gentleman to whom I allude is, Major Jno. H. Stegar, of this county, who is as remarkable for the large crops of corn which he yearly makes, as for the little labor he bestows upon them. His method is, to break the land well with a two-horse plough early in the year, taking care, however, not to turn up the clay, since he has found by experience, that the clay of Amelia, when turned up, never becomes productive. A coulter follows immediately after the plough, in the same furrow, so that the substratum is deeply broken, and a reservoir secured for the retention of moisture. By this means, and laying off his land horizontally, though with a level surface, his corn-field is but little liable to wash. In preparing to plant, a rake drawn by two horses is passed over the land in the direction of the rows for planting, and when the surface is sufficiently smooth, the rows are opened with a suitable plough, and the planting follows immediately. His rows are 5½ feet apart on ordinary corn-land, and the corn dropped from 24 to 30 inches apart. The experience of the first year, however, satisfied me, that a less distance may, with advantage be given; say 5 feet by 2. The corn is covered by a common cultivator, adapted to the purpose by taking out the front tooth. He prefers this mode of covering to any other, as it is much the most speedy, fills up the entire furrow, and pulverizes the adjacent earth. He has found that, corn planted in this way comes up better than in any other, and very rarely needs re-planting. After planting, nothing more is done until the corn is large enough to be thinned. The earth is now thrown from the corn, a single furrow on each side being run with a one-horse turning plough, the bar next the corn. The corn is then thinned to one stalk in a hill, and may then be weeded if there be hand-labor to spare. This, however, may generally be postponed until the furrow turned away is thrown back; which is done by the same ploughs immediately after they get through the field in the first operation. By postponing the weeding to this period of the cultivation, much hoe-labor will be saved, as the furrows when properly turned, will lap and cover most of the grass about and between the stalks. The grass not covered by the plough is covered by the hoe-hands; and where the earth is piled up too high against the stalks it is pulled down and levelled. This is a very rapid operation, as it often happens that no use of the hoe will be needed for 50 or 100 successive hills. When the ploughs have got through the field they commence again and turn a second furrow to the corn on each side as before, and a third furrow turned in the same manner, and at a proper time, finishes the row, and the culture of the crop. Thus the entire culture of the crop after planting requires only eight furrows of the plough to a row, two *from* and six *to* the corn, and of hoe-labor next to nothing. The principle on which this mode is founded seems to to me consistent with reason. It is simply this: that no root of the corn should be cut, if possible, and a constant accession of soft earth thrown to the roots as they extend. I know that it has lately been discovered that corn has certain latent vertical roots which cause it to prosper, however often the horizontal fibres may be severed; but giving due deference to this new discovery, and to the distinguished agriculturist who has promulged it, it still seems to me that the maturity of the plant must be retarded and its strength diminished by the severance of the least root, when not absolutely necessary. We know that the tobacco planter works his crop late in the season, when he wishes to retard its ripening, and give it the benefit of the autumnal dews. I have also been informed that the great success of a certain gentleman in Mississippi in raising cotton, who makes nearly double as much as his neighbors, to the hand, is, in a great measure, to be attributed to the fact that he works his crop as little as possible. But whether the theory be right or wrong, the above is the mode of culture pursued by Major Stegar; and to show its advantages, I might only state, that he is uniformly successful in making corn, and that his neighbors, most of whom, ridiculed his plan at first, have now generally adopted it. I doubt not that it will be generally adopted when understood and appreciated, wherever land is abundant, and labor scarce and dear. It saves so much labor, and enables a small force to cultivate so much more land than would otherwise be possible. By nearly a similar method, the last year with five horses and ten hands, I had 170 acres cultivated in corn, and sincerely believe, that after the land is broke up, 50 acres to the horse may readily be cultivated, of our common high-land. The saving of hoe-labor is also a great advantage. Not more than 30 acres of my whole crop had a hoe in it, and yet the crop was as good as my neighbors', and scarcely any difference perceptible between the portions where the hoe was used and where it was not.

In conclusion, permit me to say a word as to the Baden corn, about whose merits there seems to be so great an opposition of opinion. I planted last year about two and a half bushels, mostly on flat land, five feet by sixteen inches. Two stalks were intended to be left in each hill. But owing to neglect in thinning, the average was nearly three. Until July I never saw finer corn than some of it on the richest land. It continued green and flourishing in the midst of the drought, until attacked by myriads of chinch-bugs, at the most critical period, that of shooting. The consequence

was, that the crop was shortened fully one-third, if not one-half. I measured about four-fifths of an acre of the best, and found it to yield eight barrels. Several stalks had from four to eight ears. I shelled and measured the corn obtained from one stalk with six ears, and it turned out two pints. Now basing a calculation upon this, I think it can be proved that on suitable land, rich low-grounds, no corn in use among us can be more productive. On such land the proper distance would be five feet by eighteen inches, two stalks in a hill. Planted in this way, there would be on an acre 5808 hills, each with two stalks. Supposing the two stalks to yield six ears or two pints, which I think might certainly be calculated on, if the flat land were rich, the product to the acre would be 182 bushels, or $36\frac{2}{5}$ barrels. At only three ears, or one pint, to the hill, the product would be $18\frac{1}{5}$ barrels, a product which even a James River planter might be contented with. This corn has two other recommendations; it furnishes a greater quantity of fodder, and matures sooner than the common kinds. The first results from its very great height, and the second from the smallness of the ear and husk. Though I think it an invaluable species for rich flat-land, I cannot recommend it for high-land, on which it seems to lose its capacity of maturing more shoots than the common sorts, whilst at the same time, it suffers more from drought.

WM. H. HARRISON.

CURIOUS EXTRACTS FROM THE ANCIENT LAWS AND RECORDS OF VIRGINIA.

(Continued from page 717, vol. VI.)

The legislators of the colony had no idea of the free-trade doctrine, nor of the importance of leaving the people to direct their own industry, as the best means of increasing the general wealth. Whatever evil or inconvenience was found, whether in excess or deficiency of any product, straightway the legislative power went to work, by some compulsory direction or prohibition of industry, or use of capital, to remedy the evil. Of course their efforts were generally of no avail. It has been seen that the exportation of horses had been repeatedly forbidden, for the purpose of increasing the stock. In 1668, either in consequence of such encouragement, or (as we should infer,) in spite of it, the increase of horses had been so great, that the prohibition to export was repealed. But this was not deemed sufficient; for the next year (1669) the assembly passed a law forbidding the importation of horses, under penalty of their seizure and confiscation. This act commences as follows:

"Whereas the last assembly partly to restraine the numerous increase of horses now rather growing burthensome then any way advantagious to the country, partly to encourage trade, did permit that mares might be exported, this assembly takeing care that both the ends might be advanced as aforesaid, *have enacted, and by these presents do enact*, that noe horses or mares after the last of December next, shall be by any person or person imported or brought into this colony, from any other plantation or government whatsoever."—*Statues at Large Vol.* ii. p. 271.

Again this year, the making of silk was invited by a new act of encouragement, as follows:

"Whereas the advancement for the makeing of silke will undoubtedly tend greately, as to the present honour and reputation, soe to the future great benefitt and profitt of the country, *It is enacted* that the former encouragement of ffifty pounds of tobacco for every pound of wound silke be allotted as formerly out of the publique."—p. 272.

The same year another act for destroying wolves was passed which required of the tributary Indians, in proportion to the number of hunters belonging to each tribe, or settlement, a certain number of wolves' heads. The following commencement of the act sets forth the evil to be remedied, and the apportionment of the duty required.

"Since it is most evident that the inhabitants of this country doe receive dayly damage by wolves, and noe fitt way or temper yet found for the destruction or diminishing of them, *It is enacted* that the Indian tributaries be enjoyned and assessed to bring in a certaine number annually, that is to say:

		Bowmen or hunters.	wolves heads.
Into Nanzemond county, the Nanzemonds being about		45	9
Surry.	Pochay-icks	30	6
	Weyenoakes	15	3
Charles City co.	Men-Heyricks	50	10
	Nottaways, 2 townes	90	18
	Appomattux	50	10
Henrico county.	Manachees	30	6
	Powhites	10	2
New Kent.	Pamunckies	50	10
	Chickahomonies	60	12
	Mattapanies	20	4
	Rapahanocks	30	6
	Totas Chees	40	8
Gloster.	Chiskoyakes	15	3
Rapahanock.	Portobaccoes	60	12
	Nanzcattico / Mattehatique	50	10
Northumberland.	Wickacomico	70	14
Westmoreland.	Appomatux	10	2
		725	145

p. 274-5.

The fence law in 1670, was somewhat modified, in violation of its general principle and policy, and consequently, with just so much deviation towards the support of justice. However, the restraints imposed were upon the stock belonging generally to the rich—from which it would seem that there was a little leaven of *loco-focoism* at work in the colony, even in the time and under the rule of that

thorough enemy of popular rights, Sir William Berkeley. The act is in these words:

"Whereas the act ffor ffences doth not suffitiently provide for remedy of those many damages done by unruly horses breaking into corne ffields, *It is by the authority of the grand assembly enacted*, that the owner of such horses shall be, and hereby is required and enjoyned to take some effectuall course for restrayning them from trespassing their neighbours, from the twentyeth of July till the last of October in every yeare, it being much fitter that rich men who have the benefitt of such horses should provide for their restraint, then the poore enjoyned to the impossibility of every high ffences; and if any horse or horses shall at any tyme breake into any corne feild, the ffence being ffowre foote and halfe high, then the owner of such horse or horses, upon proofe of the damage, shall pay for the ffirst trespasse single damages and for every trespasse after double dammages to the party greived; and because question hath been made about the suffitiency of ffences according to the former act, of enjoyning them to be close to the bottome, *It is hereby declared*, that being soe close that nothing mentioned in the former act can creep through is only by that act intended."—p. 279

The last act for encouraging the killing of wolves by the Indians, being found ineffectual, was this year repealed, leaving the earlier act in force.

In 1671, millers were prohibited from taking more of the Indian corn, ground by them, than one-sixth for toll, and of the "English graine," as wheat was called, more than one-eighth part.

The long continued and favorite policy of prohibiting the exportation of wool, hides, and iron, was, by the following repealing act, abandoned at this session, on the avowed ground of the failure of the benefit expected.

"Whereas it was hoped that weavers, tanners, and smiths would have been encouraged with greater diligence and cheerfulness to have improved their severall callings for the good of the country when they were sencible what tender care was taken for supplying them with materialls for to work upon, in reference to which the exportation of wool, hides and iron, was by an act of assembly, (continued the three and twentyeth of March, 1661,) under greate penalties prohibited, and that act strengthened by diverse others since, but noe successe adswering the conceived hopes and apparent losses accrueing to all inhabitants by the refusall of those concerned to buy the comodityes aforesaid, *Be it therefore enacted by this grand assembly and the authority thereof*, that all acts tending to the restriction of selling or exporting of any of the comodities aforesaid stand repealed and every one permitted to make the best he can of his owne comodity."—p. 287.

In 1673, an act was passed to encourage the growth and manufacture of hemp and flax. It required that the county courts should cause to be distributed one quart of flax-seed, and one quart of hemp-seed to every tythable person; and each person, so furnished, was to make two pounds of dressed flax or hemp every year, under penalty of being fined 50 pounds of tobacco for each pound required and not produced.

The following enactment of the session of 1676-7, seems to indicate that there was much reformation needed among the clergy of the established and only church, as no other sect was tolerated.

"*And be it further enacted by this grand assembly, and by the authority thereof*, that such ministers as shall become notoriously scandalous by drunkingnesse, swearing, ffornication, or other hayhous and crying sins, and shall be thereof lawfully convict, shall for every such their haynous crime and wickednesse, the ffirst time forfeite to the parish or parishes wherein he or they soe offending shalbe benificed, the one halfe of one yeares sallary and dues, and the same for a second tyme he shalbe convicted, and if any minister offitiating in any parish shalbe three tymes convicted of any such haynous crime and wickednesse before mentioned, that he be forever hereafter made uncapable of offitiating in any office or ministeriall ffunction in any parish in this colony."—p. 384-5.

The following section of the same act of general reform and regulation, (which followed soon after the re-establishment of the royal authority upon the suppression of Bacon's rebellion,) shows that the freedom of speech was treated with but scant respect in that time of excessive loyalty.

"And whereas it hath beene frequent for rude and ill disposed persons to contemne and revile authority and magistrates, as well in words as in actions; *Bee it therefore enacted by this present grand assembly, and by the authority thereof*, that all and every person and persons that shall from the tyme to come presume to speake and utter mutinous or contemptuous words, or shall by any wayes or meanes abuse the right honourable the governour, or any of the councell, justices of the peace, or commissionated militia officers, and shall be thereof lawfully convict, shall for his such offence, if against the right honourable the governour, be whipped on the bare back with thirty lashes, or pay eight hundred pounds of tobacco and caske, if against any of the honourable councell, that then he shalbe whipped on the bare back with twenty fowre lashes, or pay six hundred pounds of tobacco and caske, and if against any justice of the peace or commissionate feild officer, then to be whipped on the bare back with twenty lashes, or pay fowre hundred pounds of tobacco and caske, and the like for such second offence, being likewise thereof lawfully convict. And if any person or persons, male or female, shall be convicted a third tyme of such mutany or contemptious or villifying words, writeing or otherwise, abuseing or scanduliseing the right honorable the governour or any of the honourable councell or any justice of the peace or commissionated militia ffield officer, then to be whipped on the bare back with thirty nine lashes, and stand in the pillowry two howers, or pay double the before recited ffines, all which said ffines as aforesaid shalbe and belong the one halfe to the informer, if he shall sue for the same, and the other halfe to the county," &c.—p. 385-6.

At the same session (1676-7) an act was pass-

ed regulating the rates of charges of keepers of "ordinaries," or taverns, the prices being all stated in tobacco, the legal currency of the colony. The act required that—

"Ordinary keepers selling liquors doe not demand or take more for Virginia drahmes, or strong beer or ale then is sett downe in the act of assembly made in September, 1671, that the rate of perry and syder if boyled be twenty pounds of tobacco per gallon, and if rawe eighteene pounds of tobacco per gallon, that the price of lodging be three pounds of tobacco per night, that the price of dyett where the generall court or assembly is held be twelve pounds of tobacco each meale, for the master, and eight pounds of tobacco for the servant, and in the country in all other ordinaryes, tenn pounds of tobacco each meale for the master, and six pounds of tobacco the servant. That the rate for horse pasture be six pounds of tobacco for one day and night, and if housed, for straw and hay eight pounds of tobacco the day and night, and for Indian corne after the rate of fforty pounds of tobacco the bushell, and for oates after the rate of sixty pounds of tobacco per bushell."—p. 393-4.

It is a curious fact that the importation of tobacco from the Carolinas, or in other words, the merchants of Virginia buying and exporting the products of the other colonies, was held to be so injurious to the interest of Virginia, that it was deemed necessary, in 1679, to pass the following prohibitory law. The same trade now continues from North Carolina; but the complaint is now from the other party, and with as little reason in the one case as the other.

"Forasmuch as the importation of tobaccoes into this colony from Carolina and other parts, without the capes, hath been found very prejudiciall to this country and the inhabitants thereof, and for prevention of like mischiefe and inconveniency for the future, *Bee it enacted by the governour, councell and burgesses of this present grand assembly, and the authority thereof, and it is hereby enacted*, that from and after the tenth day of October next, after this present session, noe tobaccoes packt in casque or otherwayes, shalbe brought from without the capes of Virginia into this colony, either in boate, sloope, shipp, or other vessell whatsoever, to be landed on shoare, sold or shipt of in any ship or other vessell rideing in this colony, except only by such persons as shall make it appeare that they are inhabitants of Lower Norfolke county, and that the tobaccoes by them brought round the capes, is of the growth of the said county, upon penalty of forfeiting all such tobaccoes soe brought into this colony contrary to the true intent and meaning of this act, the one-halfe of such tobaccoes soe forfeited to be to the use of the kings majestie, and the other halfe to be equally divided betweene the informer and the country. *Provided alwayes* that it shall be lawfull for any merchant or other person inhabitting in this country to fetch from Carolina, commonly called the *South*, and bring hither all such tobaccoes as are already due to him before the makeing of this law."—p. 445

From the Magazine of Horticulture.

NOTICES OF CULINARY VEGETABLES, NEW OR RECENTLY INTRODUCED, WORTHY OF GENERAL CULTIVATION IN PRIVATE GARDENS, OR FOR THE MARKET.

In again presenting to our readers our remarks on new vegetables, we feel gratified in being able to state that our notices, which have appeared in our two last volumes, have been the means of introducing to greater notice and cultivation, many of the new productions which we have noticed and described. We shall continue to add all the information which can be gathered upon this subject, and shall not let any new variety, worthy of notice, escape our attention.

Among those kinds, which have been more particularly mentioned in our articles, and which have now become extensively known, and much cultivated, are Bailey's red and white giant celery, the forty-fold potato, the early Vanack cabbage, and the Soissons bean. Each of these varieties have been much sought after, and they have proved fully equal to what they were recommended. Many of the other sorts which were noticed are now under trial, and their good qualities will soon be ascertained. New vegetables do not find their way into cultivation with the rapidity of new fruits or flowers, especially among that portion of the community who would be the most benefitted by their growth; the prejudices of market gardeners and farmers against new articles, as well as new experiments, are almost fatal to their introduction. Unless the merit of a new variety is so very great as to partake of the marvellous, it is a long period before it becomes generally cultivated. The information, however, which is now diffused through the great number of farming periodicals is, luckily, dissipating such prejudices, and the more enlightened of our agriculturists have become somewhat convinced, that there may be great improvements made in the varieties usually cultivated, as well as superior kinds introduced, which may take the place of those we now value.

The past year, there has not been so many new varieties brought into notice, as heretofore. In the kitchen garden department there have been one or two introductions of some merit. To the farm there has been one addition of great importance in the Rohan potato; indeed we may, with truth, say, one of the most important acquisitions ever made to our husbandry. The past year was not propitious to the gardener or farmer in our vicinity; the unprecedented drought, during August and September, cut short the crop of most vegetables. Potatoes suffered severely, and the only crop which may be said to have been good and large, was the squash. Corn suffered in common with all other products.

In Britain, and on the Continent, some new vegetables have been introduced, which have attracted considerable attenion; these we shall briefly notice at this time, leaving a more extended account of them to a future period, when we may do so from our personal observation.

The *Cuba tomato*, introduced by Mr. Lowell, the seeds of which he procured in Cuba, during a residence there through the winter of 1837, was exhibited before the Massachusetts Horticultural Society, and noticed by us in our reports, (Vol. IV. p. 390.) Mr. Lowell stated in a note, that it

was preferred by the Spaniards to any other variety. The fruit is rather smaller than the common tomato, of an oblong shape, and of a deep red color, not quite so bright as the former. It is fine for preserves. It is an abundant bearer, and full eight days earlier than the common kind. Mr. Lowell's recommendation is a sufficient guarantee of its goodness.

The imperial watermelon, a new variety, was raised the past summer, by T. Allen, Esq., of Hyde Park, New York, which, for richness of flavor, firmness of the flesh, thinness of the skin, productiveness, and every other good quality, surpasses any thing we have ever tasted. We do not know the source from whence the seed was procured; but it is sufficiently early to arrive at perfection in our climate, and it must become very extensively cultivated. The seed cannot, probably, be procured in any quantity, as only a few melons were raised; we shall, after the trial of another season, notice it again.

The Cedo Nulli pea, introduced for the first time last year, has promised to be a fine and very early variety, and one which we recommended to the notice of all gardeners. It is dwarf, early, and prolific. We would not have gardeners, as well as farmers, forget to cultivate, and extensively too, Groom's superb dwarf blue pea, which we have heretofore recommended.

The Rohan potato.—This remarkable variety of the potato will be very generally cultivated the coming season. The extraordinary produce in almost every single experiment which has been made in their growth, notwithstanding the past unprecedented dry season, has convinced even those who have little faith in new varieties of vegetables, that it is a most prolific, and, consequently, a valuable article. Only a very limited supply for planting could be obtained last spring, and four or five pounds was the most that could be easily procured by a single individual: but the increase has been so enormous, that, from this small amount of seed, a sufficiency has been raised to plant an acre or more.

After what we have said in our previous numbers, and the appearance of Mr. Kenrick's article, (p. 51,) it is not necessary that we should occupy the time of our readers with a repetition of the same, but simply remark, in addition, that there remains no doubt but that it is the most valuable article which has been introduced to our husbandry for many years.

We have given an account of the origin of this variety in our IV., p. 149. It was named in honor of the Prince Rohan, of Geneva, who was the first to disseminate it.

An opinion has gained ground, that the Rohan potato is very inferior to our common kinds: this, however, is a great error. We have previously given Judge Buel's opinion of its quality, and we can confirm what he has stated. When the potatoes are grown to their proper size, which is two or three pounds each, we have no doubt that, with the same care in cultivation, they will be found equal to any other variety. In proof of this, we may notice that a late London paper states, that a "new and extremely prolific variety, of German origin," was introduced last spring, and cultivated for the metropolitan market. Of its enormous produce there is no doubt; we lately stated, (p. 35,) that twelve hundred bushels might be raised on an acre; and we have no hesitation in saying that it may be made to exceed this!

A paragraph has just met our eye in the London *Gardener's Gazette*, stating that a new variety, called the mangel wurtzel potato, was introduced last spring, and that a gentleman of Waterford procured four of the tubers. These were cut into thirty-six sets, and planted on good land, with the usual quantity of farm-yard manure, in drills three feet apart and twelve inches between the sets, the whole occupying just twelve square yards. When dug, the produce was one hundred and twelve pounds, being at the rate of *thirty-five tons* to the acre, or thirteen hundred bushels. There is not the least doubt but that the mangel wurtzel potato, *so called*, is the Rohan, which has acquired the former name in England, from its great size. We again commend it to the notice of every farmer or gardener.

LARGE OAK TREES.

Loudon, in his *Arboretum Britannicum*, states that the oldest oak in England is supposed to be the Parliament oak (so called from the tradition of Edward I. holding a parliament under the branches,) in Clifstone Park, belonging to the Duke of Portland, this park being the most ancient in the island. It was a park before the Conquest, and seized as such by the conqueror. The tree is supposed to be fifteen hundred years old. The tallest oak in England was the property of the same nobleman—it was called *Duke's Walking Stick*—higher than Westminster Abby, and stood till of late years. The largest oak in England is the Calthorpe oak, Yorkshire, measuring seventy-eight feet in circumference where the trunk meets the ground. The *Three Shire Oak* at Worksop, was so called from covering parts of Yorkshire, Nottingham and Derby: it had the greatest expanse of any recorded in this island, dropping over seven hundred and seventy-seven square yards. The most productive oak was that of Gelonds, in Monmouthshire, felled in 1810. Its bark brought £200, and its timber £670, (about $4,000.)—*Arb. Brit.*

From the Maine Farmer.

MORE ABOUT HOGS.

Any experiments which render the operations of the farmer more certain, or which shall give certain data whereby to calculate the profit or loss of any pursuit in agriculture, are of great value. One trouble in the business of the farm has been the uncertainty with which the cost and the returns of investiments in this occupation has too generally been attended, owing to the remissness of farmers in keeping proper accounts. The keeping of hogs and the fattening of them, are subjects respecting which much has been said and much been written, but after all, the exact cost or an exact account current, has but in a very few instances been fairly kept. Arthur Young, many years ago, published some experiments where the expenses were laid down, and the profits also minuted. Mr. Colman also published some ex-

periments a few years ago, which we copied into the Maine Farmer. These were valuable. Until within a few years it has been generally believed that Indian corn was the only *legitimate* food for swine, and although they were fed with potatoes and the wash from the kitchen, yet Indian corn, after all, was the only sure substance wherewithal to produce pork.

Now we are willing to ackowledge the great excellence of this article in feeding and fattening hogs, and almost every other animal—man not excepted; but oftentimes the expense of it is so great as to render it very unprofitable as an article for swine diet.

The experiments and researches of Mr. Colman, if we mistake not, established it as a fact that it should not cost more than *four shillings* (67 cents) per bushel, in order to render it profitable for making pork when round hogs sold at 6½ cents per pound.

In situations where flour mills abound, the article called pollards, a portion of the ground wheat not fine enough to pack in barrels as flour, is oftentimes used as a food for fattening hogs. According to Young, a Mr. Jebb, a miller of Ireland, instituted some experiments to ascertain its value for this purpose. According to him, a barrel which would weigh 84 lbs. paid in feeding and breeding hogs, 18½ cents per hundred weight—that is, when pork is worth $4,44 per cwt., he could make 18½ cts. per bushel, weighing 21 lbs. by feeding it out to hogs.

Mr. A. B. Allen, of Buffalo, N. Y., who is doing great good in his experiments in breeding and improving swine, and who has produced some excellent animals by his judicious crosses, informs us that he kept his full grown swine last winter, in the best of order almost exclusively on raw potatoes, at a cost, including time of attention, of only *three cents* per day per head; and he gives it as his opinion, that had he possessed an apparatus for steaming their food instead of giving it raw, he would have saved from 25 to 30 per cent on the above trifling cost. He also remarks, and we think with great propriety—that if this can be done in New York, Maine, with the best soil and climate in the world for the production of potatoes, can do it with much more advantage.

IRRIGATION OF LOMBARDY.

From Arthur Young's Notes on the Agriculture of Lombardy.

Lombardy is one of the richest plains in the world; for fertility of soil, united with the use that is made of it by watering, it much exceeds every other in Europe; but for mere natural fertility, I take the plain which extends from Holland to Orleans to consist of a richer soil, and it is also of a greater extent. From the foot of the Alps, near Suza, to the mouths of the Po, are about two hundred and fifty miles; and the breadth of this noble plain varies from fifty to one hundred, containing, probably, about fifteen thousand square miles. The Po bends its stately course through the whole extent, its branches ramifying, in innumerable streams, from the Alps on one side, and from the Appenines on the other; the prodigious extent of the fermer range, covered with eternal snows, afford a vast supply of water; preserved most conveniently in those immense reservoirs, the Lago Moggiore, Lugano, Como, Iseo, Guarda, whose waters are the origin of the greater part of the irrigations of Lombardy. But in the Appenines there are no such reservoirs, nor any extent of snow similar to that of the Alps. Thus the space watered to the north of the Po, is probably ten times more considerable than that to the south of the same river.

The soil of Lombardy is, wherever I viewed it, either sand, gravel, or loam. I met with none, or at least, with very little clay (speaking always as a farmer, and not as a naturalist,) and no chalk.

* * * * * *

If there be one circumstance which gives a superiority to Lombardy, over all the other countries I have seen, it is this, [its irrigation] and therefore it merits the most particular detail.

PIEDMONT—*Nice.*—Such is the consequence of water here, that a garden of 4 sestaradi, (a square of 12 trebucchi, *i. e.* 144 is a sestarada, and 400 trebucchi a giornata, which is to the English acre as 0.7440 is to 0,7929,) with a small house, lets at 20 louis d'or per annum, or about £15 an acre.

Coni.—For the last 10 miles from Nice to Coni, the country improves continually. The soil, near the mountains, is stony, but is a good sandy loam lower in the vale. It is perfectly level, and watered with the utmost attention, in a manner I had not noticed before; not, as in Spain, in beds, but the field is ploughed flat, sown with wheat, the clods broken with hoes and bush-harrowed, and then great deep trenches struck with the plough, for letting in the water; these are 8 to 12 yards asunder. They are now (September,) watering clover eight inches high, by letting the water into these trenches, and conducting it in a singular manner. A man walking backwards, draws, by a line, a bunch of straw and weeds, just large enough to stop the water in the trench, and force it to overflow on each side. This is an expensive and operose method, and inferior to the Spanish. The crops now on the ground are maiz; good, but not extraordinary: millet, and a little hemp; the male plants picked. A great deal of clover, but not much that is clean. But meadow abounds, which is the glory of Piedmont; and the conducting of the water, in multiplying conduits, seems well understood, and practised in great perfection.

Coni to Chentale.—In the watered meadows, much *chicorium intybus* and *plantago lanceolata.* Watered meadows are cut thrice commonly; but in some seasons, four times.

Racconis.—The watered meadows are now mowing for a third time; the predominant plants: the *chirorium intybus, plantago lanceolata, acchillea millefolium,* and *trifolium pratense.*

To Turin.—From Coni to Turin, something more than half the country appears to be watered; possibly two-thirds: and wherever the water is carried, it is apparently with great skill. It is, however, rather singular that more trenches are not cut for taking the water off the land; the attention is chiefly paid to bringing it on; from which we may conclude, either that the heat of the climate renders such drains less necessary than in England, or that water is too valuable, from every one understanding its use, to be brought on in the least

superfluous quantity. The contrivance, towards Turin, for carrying the aqueducts of irrigation across the roads, are beautifully executed: for convenience of distribution, the water-course is raised three or four feet, or more, above the general level: these aqueducts are brought to the side of the road, and seemingly finish in a wall, but really sink in a syphon of masonry under the road, and rise on the other side, behind another similar wall. Seeing these buttresses of masonry, without perceiving, at first any water, I wondered for a moment, to what use they could be assigned; but when I mounted the foot-way, this beautiful contrivance was at once apparent. These are noble exertions.

Turin.—The irrigation in all this vicinity, is extensive, and carried to great perfection. Water is measured with as much accuracy as wine. An hour per week is sold, and the fee simple of the water is attended to, with the same solicitude as that of the land. Rich meadows, without water, sell for 1000 *liv.* and 1100 *liv.* a giornata; and arable, worth 500 *liv.* without water, is, in many instances, worth 2000 *liv.* with it. Such a meadow as will sell for 1100 *liv.* or 1200 *liv.* per giornata, will yield the first mowing, 115 rubbii of hay, worth 9*s.* to 10*s.* the rubbio; the second, 90 rubbii, at 7*s.* to 8*s.*; and the third, 80 rubbii, at 6*s.* to 7*s.*; the fourth growth is sold, to be eaten by sheep, at 5 *livres.* This produce amounts to 120 *livres*, or 6*l.* English, per giornata, which is under an acre. The interest of 1100 *livres*, being at 40 *liv.* or 50 *liv.* there remans a sufficient profit, after all expenses are paid. During the winter, as the meadows are commonly fed with sheep, they do not water at all. Some experienced cultivators avoid watering in the spring, till the frosts are over, which happen here as late as the 10th, and even the 15th of May, as strong fresh vegetation is, in such cases, entirely cut off; but, in general, no attention is paid to this circumstance; and watering goes on at all times, except when sheep are on the ground. Those who have water enough, let it on to their land once a week, during the whole summer; but if the weather is wet, once a fortnight; and a day or two before cutting, if the water is perfectly clear. In regard to the quality of water, they make no other distinction than that from mountains being cold; and that of the Dora, near Turin, being charged with so much sand as to be bad. They attend to the cutting of weeds in the canals, that they may rot; and some good managers harrow the bottoms in the spring, to foul the water, which then acts more powerfully as a manure. Another practice, which tends also to prove what excellent farmers they are in all that respects meadow-grounds, is that of paring and burning, which they perform on pieces that have a bad herbage, or want of improvement; but do not sow them with corn, or any other plant, except hay-seeds, in order to renew the grass, with no other interruption. It is impossible to praise such practices too much. They call this husbandry *motara.*

The power of effecting the great works in irrigation, which are visible over this whole country, depends very much on the law, which supposes the right and property of all rivers to be vested in the king; consequently all canals taken from them are bought of him; and this ensures another regulation, which is the power of carrying the water, when bought, at the pleasure of those who buy it, where they think fit; they cannot, however, cut across any man's ground, without paying him for the land and the damage; but the law does this by regulations known to every one, and no individual is allowed a negative upon a measure which is for the general good. The purchasers of water from the king, are usually considerable land owners, or communities that have lands wanting water; and it is of no consequence at what distance these lands may be from the river, whence the water is taken, as they have a right to conduct it where they choose, provided they do not cut through a garden or pleasure ground. Nor can they carry the water *under* that of others, whose canals are already made, as they might in that case deprive them of a part of their water; they are obliged to throw aqueducts *over* such canals. The benefit of water is so great and well understood, that nobody ever thinks of making objections; and in case their lands are not already watered, it is no small advantage to have a new canal brought through them, as they have the opportunity of buying water of the proprietors. It is sold per hour per week, and even half an hour, and down to a quarter. The common price of an hour per week, forever, is 1500 *liv.* At Gruliascho, four miles from Turin, there are many Persian wheels that lift up the water by buckets; the wheels are double, with washers between for the stream turning them; the buckets or boxes on one out side only; they raise the water 8 or 10 feet, and, about 2½ short of the full diameter of the wheel, and I could not perceive that they lose a drop; none falls, except what adheres to the wheel itself. To save the expense of multiplying sluices, for the occasional stoppage of water, in carrier trenches to force it over the land, they have a moveble board that fits the trench, which is placed occasionally where wanted, and answers the purpose well. They have none of the ramifications of carrier trenches common among us; and not so many drains for taking the water off, as with us; and, on the whole, do not shew any thing like our attention in the use of the water, though twenty, or rather an hundred times more in bringing it from rivers, and distributing it about the country; and I could not but observe, that their meadows have much bad herbage, and many places damaged by the water resting too long; this is more the case here than it seemed to be from Coni to Racconis, where the meadows carried a better countenance.

Turin to Chivasco.—Not one-third of this country is watered. At Chivasco but little also. After crossing the Dora Belta, there are soon two considerable canals of irrigation; one made two years ago only, which is as great a work as a navigation in England.

Ciglione.—Little land watered in this country; but I observed here some meadows, with off channels, from the principal ones, for conducting the water, which I did not notice before; but very few drains. The new canal crosses a gravelly waste, but none of it watered.

Trouchan.—A very rich country much watered; and many mulberries.

St. Germano.—Mowing the third crop of grass, and very poor; not more than 15 cwt. an acre, and yet watered. The glory of Piedmont is from Coni to Turin. Those who pass Mont Cenis to Turin, and Turin to Milan, see, on comparison, nothing.

Vercelli.—The new canal, now making, for taking water from the Dora Baltia, and conducting it to the rice grounds of Vercelli, is done by the king, and will cost three millions; the water is sold to communities. The other I crossed near the Dora, at the same time, was made long ago, and belongs to the Marquis de Bourg.

MILANESE.—*Buffalora.*—After crossing the Tesino, in several branches, and entering the Milanese, we find a great system of watering meadows to Buffalora, where that magnificent canal, the Navillio Grande is 20 yards broad, and though navigable, was originally made for irrigation alone.

St. Pietro Olmo.—Hence, for some distance, there is no watering; but then there is something in our Berkshire method; the lands are arched up, and just in the centre, on their crown, are the carrier trenches for conducting the water, and on each side a row of low sallows; some of these lands are two rods broad, and two feet higher in the ridge than in the furrow; the land firm and the herbage good: wherever the meadows seem good, there is abundance of *chicorium intybus, plantago lanceolata,* and *trifolium pratense.*

Milan.—As the irrigation of Milanese is perhaps the greatest exertion of the kind that ever was in the world, and certainly the first that was undertaken in Europe, after the decline of the Roman empire, it merits every attention that a farming traveller can give; for it will be found, by very briefly recurring to records, which have been searched, that great exertions (perhaps as great as ever known) were made in this country, at a period when all the north of Europe was in a state of barbarism. In the year 1037, mention is made of the canal Vecchiabbia. In 1067, watered meadows were common, called *prato roco* by Landolfo.* In 1077, there are notes of many streams used. In 1138, the monks of Chiarevalle bought of Giovanni Villano some commons, woods, and meadows for 81 *liv.* under the contract, (a parchment yet remaining,) "*ut monasterium possit ex Vectabia trahere lectum ubi ipsum monasterium voluerit et si fuerit opus liceat facere eidem monasterio fossata super terram ipsius Johannis ab una parte viæ et ab alia****&c. possit firmare et habere clusam in prato ipsius Johannis, &c.*" There is a similar contract of the following year, and various others, until the beginning of the 13th century; from which, and others, it appears, that the Vecchiabbia was the entire property of the monastery, and confirmed in 1276 by the diploma of the Emperor Frederick II. The merit of these monks appears to have been great, for they gained such a reputation for their skill and industry, that they had many applications for assistance in directing works similar to their own upon uncultivated lands; and the imperial Chancellor Rinaldo, in the time of the Emperor Frederick I. being appointed arch-bishop of Colone, found the possessions of his fee in such a deplorable state, that he applied for, and found the same assistance, as reported by Cesarior Eisterbacense. Their greatest exertions were in irrigation, which was so well known, that they sold their superfluous water, transferring the use and property of same by the hour, day, and week. In two centuries they came to be possessed of 60,000 *pertiche,* mostly watered: there is reason to believe that the practice, in the 13th century, did not materially differ from the present modes; because, in the papers of the archives of the abbey of that period, mention is made of *chiuse, incastri, hochilli, soratio,** and other works, to distribute the water, and regulate the irrigation.† In 1164, the Emperor Frederick gave various rights, in certain rivers, to the people of Pavia, for the purposes of irrigation.‡ In 1177, the people of Milan enlarged and continued the Navillio Grande, from Abbiate Grasso to Milan, being 14 miles; it was brought from the Tesino, near the Lago Maggiore, to Abbiate Grasso, 20 miles, by the people of Pavia, long before the date of any records now known to remain.§ In 1271, it was made navigable. It is thirty-two Italian miles long, and twenty-five bracchi wide, or forty-nine English feet.‖

The second great work, was the canal called Muzza, which takes the waters of the Adda, at Cassano, and carries them to Marignano, there dividing and watering much of the Lodizan. It was executed in 1220,¶ and done in so admirable a style, that Padre Frisi, in the preface to *Modo di regolare i fiumi, &c.* says,—"*il meccanismo d'irrigar le campagne é stato ridotto all'ultimo grado di maestria e di persezione nel canale di Muzza.*"** And Padre Antonio Lecchi, another great engineer and mathematician, remarks,—"*De' nostri trè celebri canali di Muzza, e de'due navigli qual altra memoria ci rimane ora, se non se quella del tempo della loro costruzione, e d'altre poche notizie, niente concernenti al maraviglioso artifizio della loro condotta*"††

In 1305, the canal of Treviglio was made, which takes the water from the Brembo, and carries it, for several miles, about twenty-five feet wide, and about three deep; it irrigates the territory of Triviglio and the Ghiara d'Adda. And, within four or five miles, there are five canals, taken from the Adda and Brembo, all of great antiquity. In 1460, the canal de Martesano was begun, under Duke Francis Sforza I.; it was twenty-four miles long, and eighteen braccia (thirty-five English feet,) wide; since lengthened seven or eight miles more. It takes the waters of the Adda, a little before Trezzo, by means of a powerful wear, *(chiuse)* founded upon the living rock; it is then supported for five miles by a solid wall of stone, forty braccia (eighty feet,) above the bottom of the Adda, and parallel with it. At Gorgonzola, it passes over the torrent Molgora, by a bridge of three stone arches. At Carsenzago, it is crossed by the river Lambro, which enters and quits the canal with all its floods. And, in order to prevent the surplus of water, which this circumstance occasions, from breaking the banks of the canal, or overflowing them, there are nineteen scaricatori in the canal, above, below, and facing the junc-

* *Giulini,* tom. iv. p. 122, 224, 225.

* *Chiuse,* are sluices; *incastri,* are water gates, that are moved perpendicularly; *bochilli,* openings in the banks to distribute water; *soratoi,* discharges for carrying off superfluous water; the same as *scaricatori.*

† *Memorie Storica ed Economica full' Irrigazone de Prati. Don. Ang. Fumagalli Atti di Milano,* tom. ii. p. 215.

‡ *Giulini,* tom. vi p. 330.

§ *Nuova Raccolta d'Autoriche trattano de tmoto dell' Acque.* Parma. 1768. 4to. Tom. vii. P. Prisi. p. 97.

‖ *Ibid,* p. 98.

¶ Verri, Storia di M. t. i. p. 240.

** Nuova Raccolta, tom. vii.

†† *Ib Piano, &c. de tre torrenti,* p. 141.

tion, which are so calculated, that they have not only powers sufficient to take off the waters of that river, but also half of those of the canal itself. These scaricatori are canals which take the water when slui e-gates are opened for that purpose, and convey it, at various distances, to the Lambro again; the fall in its course being considerable enough to free the canal from all superfluity of water. Near Milan, this Navillio receives the torrent Seveso; and, after surrounding the city, unites with the Navillio Grande and the Olona. The sluices which Bellidor supposed to be invented by the Dutch, were used, for the first time, near Padua, in 1481, by two engineers of Viterbo, Dionysius and Peter Domenico, brothers.* Leonardo da Vinci profited immediately of this great invention, for the union of the two canals of Milan; and finding between them the difference of the levels to be eighteen braccia, he, with six sluices, in they ear 1497, under Ludovico il Moro, opened and facilitated the navigation from one to the other. The greatest *scaricatori*† of the waters united at Milan, is the canal of Vecchiabbia, which, after having served some mills and irrigation, falls into the Lambro near Marignano; and if this canal were made straight, and supported by some fluices, the navigation might be continued to the Lambro, and thence to the Po and the sea. Both these canals, the Grande and the Martesano, are so contrived as to be completely emptied once a year, for cleaning and repairing whatever accidents may have happened to any of the works.

I have entered into this digression upon a very curious subject, little known in English literature‡, in order to shew how well irrigation was understood, and how admirably it was practised, when the countries on this side of the Alps were barbarous. At the same time, however, that justice is thus done to these great exertions, we must bear in mind, that few districts in Europe are better, or so well situated for irrigation. The lakes of *Maggiore* and *Como*, nearly upon the same level, are three hundred feet (one hundred and fifty braccia) higher than Milan,—and that of Lugano two hundred feet higher than those, with a nearly regular declivity to the Po.

* * * * * *

(To be continued.)

---

* *Moto dell'Acque*, vol. v. Parma, 1766, p. 359. Mentioned by Zendrini in the tenth chapter, *Sopra l'Acqua Corrente*. This is the common supposition in Lombardy, and is thus recorded; but it appears to be an error, by a passage in *Giulini*, tom. xii. p. 332, where, anno 1420, mention is expressly made of them, *machinarum quas conchas appellant, &c.*

† The *scaricatori* are what I believe we call wears in England; they are discharges of superfluous waters. Mr. Brindley made them, in the Duke of Bridgewater's canal, circular, and in the centre of the river, to convey the water, as into a well; but in Italy they are cuts or openings in the banks of the canal, at places that allow a quick conveyance of the water; for instance, where a canal crosses the bed of a river: their powers are calculated with such a mathematical exactness, proportioned to the quantity of water brought into the canals, by the rivers joining them, that no floods ever effect the surface, which is of an equal height.

‡ One would naturally look for some knowledge of these facts in *Anderson's Deduction of Commerce*; but we shall look in vain.

BORROWERS OF THE FARMERS' REGISTER.

We have often been told, by subscribers to the Farmers' Register, of the great demand for their numbers, by some persons who found it cheaper thus to borrow, than to pay for the work, and who were willing thus to profit at the expense of those who do pay, and still more at the expense of the publisher. It has, indeed, often been reported to us from neighborhoods which perhaps had furnished but two or three subscribers, that their numbers were so popular, that the owners could not keep them at home, nor prevent their loss or destruction in the hands of borrowers; and sometimes in places where no new name had been added to our list for years together, this practice of habitual lending of the numbers by some one of the few subscribers has been mentioned as a friendly service rendered, to promote the circulation of the work, and as a plea of merit, in asking for duplicate numbers in place of the copies lost or spoiled by the borrowers. By such reports, we were even flattered, and gratified that our publication should thus be sought for and read, though by those who chose to avoid paying for it. But there is a limit to every thing; and the limit of our gratification, and tolerance of this wide-spread and growing practice has long since been exceeded.

Whether many, or even any, of these borrowing readers would become subscribers to and payers for the Farmers' Register, if they could no longer borrow, is more than we can tell; but even if no more gain is derived than is expected from such sources, still the cessation of the practice of lending will prevent the loss and destruction of thousands of numbers, which are caused by the borrowers from the owners, (*or takers without leave of the owners*, from the post-offices,) and which losses we have then to supply, and without remuneration. It is not unlikely that we have, in the course of this publication, furnished, and without charge, as many duplicate numbers as would, at subscription price, have cost $1000, to replace those lost or damaged by being borrowed. Yet sundry of these borrowers, within our knowledge, are very wealthy men, and who would be utterly amazed to be supposed guilty of an illiberal, much less an unjust or *mean* act, for the sake of saving the few dollars, the outlay of which would make the property their own, and pay what is due to the producer. By the published conditions, we have always engaged to furnish duplicates for copies not received by mail, under certain restrictions as to time and manner of notification, &c. This obligation has not only been readily and willingly discharged in every case, but we have never adhered to our limits, the proper and seasonable safeguards against too great carelessness of subscri-

bers, and of too great loss to ourselves—but have supplied all duplicates asked for, no matter when and how lost, and have never charged for any, except in a very few cases, when the losses amounted to nearly a volume, or more; and when, moreover, they were admitted by the subscriber to have been caused by his own fault. There has been no refusal to supply to any subscriber duplicates of one, two, or even three lost numbers, and without any charge, and even when he had no claim under the rules, if they could be furnished without destroying an entire volume; and in many cases even that loss, of $5, has been suffered, by giving away a single duplicate number.

But this excessive and most onerous indulgence cannot be longer permitted to grow, or to exist; and the conditions for supplying duplicates of numbers hereafter lost, will be required to be complied with by all subscribers who may claim its benefit. The article stating these conditions was omitted in the last change of form, by accident, and not by design. It is now replaced, (Art. XI of Conditions,) and is as follows. We beg our subscribers to observe that *three things* are there required to make their claim valid—and that all these will be required, in regard to losses which may occur *after* this notice.

"For all copies not received by mail at the proper post offices, duplicates will be furnished to those subscribers *who have complied with their own obligations;* provided that the failure *shall be notified through the postmaster*, and *within two months after the date of the miscarried copy.*"

The requisition of the evidence of the post-master (or his assistant) is not made because it is deemed better than that of the subscriber, but because none other *can* know the fact of the missing number not having been brought by mail. It is decidedly for the benefit of the subscriber that the statement of the post-master should be required, if the officer is (as is too often the case,) very neglectful of his official duties. For, if knowing that he will be expected to testify as to the non-arrival of lost numbers, he will be more careful to prevent their being borrowed, or taken away from his office.

We earnestly hope, that our subscribers and friends will see the propriety of these remarks, and will take no offence at our now requiring, what in fact, our conditions and justice and propriety required always.

To enforce the long established rule is all that we can do to restrain the depredations and heavy losses caused by the practice of borrowing. But we earnestly beg of all our subscribers who desire the prosperity of this publication, that, for the sake of promoting that end, as well as to check a most shameful abuse and injury of our right of property, they will hereafter refuse to lend the Farmers' Register, habitually, to any one who is able to pay for it. And to the borrowers, the poor as well as the rich, if we should still have access to them as heretofore, we will say, that at the very low price at which the Register can now be obtained, they can more cheaply pay for it and own it, than to pay the cost of the mere labor of borrowing and returning the numbers.

We also ask another favor of our subscribers, in aid of the object proposed; which is to forbid their numbers being taken out of the post-offices by any person without their special authority and order. If we can be guarded against the actual and direct losses caused by both classes of borrowers, (those *without*, as well as those *with* leave,) our guaranty of safe mail-transmission will add but a mere trifle to the general cost of publication.

The loss of copies, first to subscribers, and next to the publisher, by having to supply duplicates, is not the only manner in which the latter suffers. Sundry subscribers who are subjected to many of these losses by borrowers, or by a very negligent or a very accommodating post-master, cease to ask that their losses may be repaired; but to get rid of the vexation, discontinue their subscription. Thus, in various ways, we are made to suffer so much from this system, that we could more cheaply issue, for the benefit and use of the borrowers, and as a supply for the negligence of unfaithful post-masters, an extra impression of 300 volumes annually, provided, that by paying so much, all other losses and injuries, from these sources, could be avoided.

But, though requiring, henceforward, the conditions of re-supply to be complied with, we can, without adding to the great losses already sustained, and will with pleasure, and gratuitously, furnish duplicates of all except the deficient Nos. of Vols. 2 to 6 inclusive. Therefore, all old subscribers, who have lost any of the numbers which are surplus, may be supplied with any reasonable number, by writing for them, (post paid) within a few weeks after this notice.

The surplus numbers which can be thus given, are, at present, the following:

Vol. 2—All the Nos. except No. 3, and Index, which are deficient.
Vol. 3—All except Nos. 5 and 12, and Index.
Vol. 4—All except Nos. 1 and 2.
Vol. 5—All except No. 8.
Vol. 6—All except Nos. 4 and 8.

Any persons who may have to spare any of the numbers stated above to be deficient, will confer a favor by giving every such one. Our previous offers to *buy* such, at high prices, have been almost fruitless.

HUMBUGS. MULTICAULIS SEED AND CHINESE CORN.

It would seem that the information which we have aimed to furnish to our readers and the public is very little prized; nor is availed of even when it would prevent the most bareſaced and shallow yet successful and gainful deceptions, which are continually imposed upon the agricultural public. It has been about five years since we first published the fact that the seeds of the multicaulis would not re-produce their kind, and that, of course, they were worthless for propagating the parent stock; and from time to time this warning has been often repeated, accompanied with the most positive proofs of its truth. Yet, notwithstanding, thousands of persons, and many even of our subscribers, have bought at enormous prices what has been sold for multicaulis or Chinese mulberry seed, and have failed, of course, to obtain a single genuine plant. Seed so named and recommended is still frequently advertised for sale; and at this time there is offered for sale 20 lbs. of it, by a salesman in Baltimore, every grain of which will probably be bought, (provided the price is *high enough,)* and be allowed to perpetrate a fraud, unless the planter should be so lucky as to find that it *will not vegetate.* It will add but little force to our charge, to say that not one pound or even ounce of seed truly produced from the morus multicalis has ever been offered for sale. All believe this who are well informed on the subject. But even if all the parcels of seeds so advertised were in truth so produced, they would be no better, and their progeny no more like the multicaulis than the seeds really sold, or those of any other kind of mulberry.

Another among the greatest of humbugs was the "Chinese tree-corn," advertised by Grant Thorburn, and puffed by so many papers who aided his "benevolent and charitable" design. We presented so full an exposure of this very shallow, and yet very successful imposition upon the public credulity in a former number, (p. 490, vol. vi.) that it was considered useless to pay any further respect to a matter so small and contemptible, by republishing the more detailed charges and exposures which afterwards appeared in the 'Journal of Commerce.' Well! the result has been that the "Chinese corn," which had been advertised by Thorburn at 25 cents a ear has since been selling under our nose here, as well as elsewhere, at $1 the ear—and bought by hundreds who have had ample opportunity to profit by the notice which we had taken of the humbug.

If our attempted exposures of humbug seeds, &c. actually serve to advertise and give them greater currency with purchasers, we wish at least that *that fact* could be understood by the salesmen of such articles. In that case, perhaps, they might be willing to *pay* for our denunciations, such bribes (direct or indirect) as we have refused to receive as the price of puffs and recommendations.

REPRINT OF VOL. I. OF FARMERS' REGISTER.

The printing of another edition of vol. I. of Farmers' Register has been commenced and will probably be completed within a few months. To those persons who may hereafter send orders and *payment in advance* for full sets of seven volumes, the new edition of vol. I. will be supplied, as soon as ready, at the same price as the others are offered in the conditions, when three or more are bought and paid for at once; that is, at the rate of $10 for every 3 vols. Those persons who have recently bought and paid for full sets, and who could not then be supplied with vol. I, shall have the benefit of this allowance. No copy of vol. I will be furnished at the above price, except as a part of a full set sold, or to complete the set of a subscriber. By the single copy, vol. I will still be at $6, the price at which old and used copies have been bought back by the publisher for the last two years, and which was offered by advertisement, and paid as long as one could be thus obtained. Of the new edition there will be but a small impression, (as it will be wanting only to complete full sets,) and therefore the expense of printing will necessarily be great compared to the returns; and most probably, the sales will not cover the cost. Those who desire to be certainly and speedily supplied with copies, are requested to send their orders and payments as early as may be convenient.

SMITH FUND.

The subscribers to the "Smith Fund" are requested to make payment, forthwith, by checks payable to the order of the undersigned, or in any other manner. The committee will not wait more than a few weeks longer to dispose of the portion already received, even if the much larger balance subscribed should still remain unpaid.

For the Committee,

EDMUND RUFFIN.

Petersburg, Va., March 30, 1839.

STATE OF THE MULBERRY TRADE.

Since our last remarks on this subject, there has not only been no decline of prices, but they

have been maintained and even increased, while the commodity bought was in many cases every day getting much worse by keeping, and by the advance of the season. It is astonishing that there should be so little regard paid to the preservation of the healthy condition, and even of the vitality, of the trees and cuttings which are held and sold at such high prices. It would seem as if most of both the holders for sale, and the purchasers for planting, believed that the cuttings would preserve both life and health under any kind of treatment, or degree of exposure. Many will find themselves egregiously mistaken; and many thousands of trees, whether with or without roots, which have been kept for sale, drying through all winter, will either not vegetate at all, or a puny and sickly progeny of plants will be produced from the dried and almost sapless stems and cuttings. Many thousands of other plants will have perished by too much care improperly bestowed for protection; which losses, however, will fall on the holders, as *such* plants will be too obviouly damaged, or spoiled, to be used. Those holders who have refused to sell until the planting cannot be longer safely delayed, and still more those whose stocks are the worse for keeping, must then sell, or lose all; and under such circumstances, it seems not unlikely that there will be a sudden fall in price, in such places as the too great anxiety for higher prices has caused plants to be kept back too long, or where neglect and bad management have caused them to be injured. The holder who cannot use a stock that would perish in a few days, will of course sell at any price rather than lose all. And yet, those who may wait and buy under such circumstances, may find the lowest prices much the dearest in the end. There remain, however, very few for sale in Virginia, and almost none, except such as have been recently sent on from the north.

The planting is already nearly over in lower Virginia, and all farther south; and indeed the buds have so much started that still earlier planting would have been safer. When the planting season is quite over, and no more cuttings can be set out, then will begin the sales of the growing crop. And in regard to these, the public may be prepared for much unintentional deception, as well as gross and designed frauds. The enhancement of price was so sudden last year, that none had prepared to deceive; and no counterfeit article has been yet heard of, except some bass-wood cuttings sold in Massachusetts. But it is so easy to substitute other kinds of mulberry trees and cuttings for the multicaulis, that it will be done to great extent, if the prices should be high enough to invite such frauds. There will be no safety for buyers except in their either seeing the plants when in leaf, or receiving them immediately of the planter, and having in his character, or in other proof, a sufficient guaranty of the absence of fraud. In the manner in which numerous and large sales have been made, the same stock passing through the hands of four or five successive holders between the raiser and the final owner, all responsibility is lost; and if a fraud had been committed, it would be impossible to fix it on the real perpetrator, nor would it have been suspected by the other and honest holders of the stock so adulterated or substituted.

We mentioned *unintentional deception*—which may seem a contradiction in terms. There was, however, much of this during the past season, (and even unavoidably so,) in the circumstances of the same stocks being advertised by several successive holders, and the advertisements being all before the public at once, making it appear that each particular stock or quantity was three or four times as great as it really was. A system much more deceptious, we are sorry to see, has already been commenced, and which may be extended *ad infinitum*. By an advertisement in a Georgia paper, a dealer in Virginia offers to sell *five millions* of trees next November, when the offerer certainly does not own, nor probably has the control of a tenth, if even a hundredth part of the number offered. All that is meant by any such offer as this, when the advertiser has not the trees actually planted and belonging to himself, is, that if he can make an advantageous engagement to *sell* a number of trees, that he will engage to procure enough to furnish the supply—and thus contrive to make one engagement meet another. But if the very erroneous inference were drawn, that each adventurer actually *held* the trees he may offer to sell, it may appear that there are for sale by our planters a hundred times as many as are actually growing in all Virginia, or even in all the world.

ANSWERS AND EXPLANATIONS TO SUBSCRIBERS.

In answer to numerous inquiries, or remarks, showing mistaken and erroneous impressions of subscribers and correspondents, (some case of which is continually presented,) it is deemed proper to give here the following general answers or explanations; though the same in purport have been repeatedly stated in the conditions, or in other notices to the public.

There are no general agents for the Farmers' Register, nor will any such agency be established, without previous notice, nor is any such measure now designed. Neither is there any *special* or *limited agency*, except to this extent, that the

accounts for arrears of subscriptions are, when it is deemed necessary, put into the hands of collectors specially authorized to act. If a subscriber requests any person to give an order of discontinuance, or to pay subscription money, or to do any thing else in regard to the Farmers' Register, that intermediate person *is the agent of the subscriber*, and not ours'; and we are in no respect to suffer by the failure of the person to render the service so requested.

No credit will be hereafter given, or account opened, for sums for which a deduction is allowed for cash advanced. The least reflection will show the necessity for this rule. The prices and deductions for joint and advanced payments are plainly stated in the Conditions; and should any advanced payment miscarry by mail, we are bound to bear the loss, and will furnish the volumes so ordered, upon exhibition of the fact of the lost remittance. Therefore, there is no necessity for, or convenience gained by, not sending payments with the first orders. If any charge for joint subscriptions, or large purchases of volumes, has to be made, it will hereafter always be entered at the regular and full price of $5 the volume.

For the Farmers' Register.

MONTHLY COMMERCIAL REPORT.

The present month has not been one of improvement in the prices of produce. Most articles have declined from the high rates which they had previously attained. Money is less abundant. Tidings from Europe have been less frequent, rather unsatisfactory, and the latest are now six weeks old. The disturbances in Canada have been succeeded by those in Maine, creating apprehensions in the minds of some that our friendly intercourse with Great Britain may be interrupted. Vessels are scarce, and freights high. Speculation, which some weeks ago was active in every article of domestic produce, has been arrested by those causes, fortunately perhaps, for those who were sanguine.

Tobacco has declined about $2 per 100 lbs., and may now be quoted at $7 to 15, although the belief in a very short crop remains unchanged. The price of flour is full a dollar per barrel lower, and country brands cannot be readily sold at $7. Wheat is down to $1 35 to $1 45 cts. Cotton is dull at about ½ cent decline, and now sells at 13¾ to 14½ cts. The receipts in all ports are about 200,000 bales less than in March last.

Stocks generally have felt the unfavorable influence; and in the northern cities, where it has been most prevalent, the decline is very considerable.

The next news from Europe is anxiously looked for, but the political aspect, it is apprehended will be unfavorable.

Exchange on London 9½ per cent. premium.

March 26, 1839. X.

From the American Silk Grower.

LONG PRESERVATION OF THE VITALITY OF SILK-WORMS' EGGS.

I have ascertained here that silk-worm eggs have been preserved in ice-houses for *twenty-two* months, and that they hatched as well as new eggs, by being hatched in a moist air; a too dry air was probably the cause of failure at Burlington last year. S. W. C.

Table of Contents of Farmers' Register, No. 3, Vol. VII.

ORIGINAL COMMUNICATIONS.

	Page
Essay on the production of silk, and the peculiar advantages of Virginia for the culture	140
On the causes of failure of the crop of cocoons, in 1834, in the department of Gard	150
Profit of improving poor land	153
The advantage of steaming food for stock	157
Improvement of land by grass husbandry. Hay making	162
Improving land by liming	166
Essay on Vegetable Physiology, by Prof. Armstrong, Chap. V.	169
Do. Chap. VI.	172
Sale of Durham short-horn cows	175
Is the planet which we inhabit becoming colder?	175
Remarks on wine-making	179
A profitable mode of cultivating corn	180
Extracts from the ancient laws and records of Virginia	181
Borrowers of the Farmers' Register,	188
Humbugs. Multicaulis seed and Chinese corn,	190
Reprint of Vol. I. of Farmers' Register,	190
Smith fund,	190
State of mulberry trade,	190
Answers and explanations to subscribers,	191

SELECTIONS.

	Page
Essay on the breeding of live-stock, and the comparative influence of the male and female parent in the offspring, (concluded,)	129
Ice-houses,	130
Lime—its profits and cost,	131
Exhibit of the value of silks imported in the United States, and exported from 1821 to 1837, inclusive,	132
The short-horn fever in Kentucky,	132
Electro-magnetic power,	133
Sugar beet and ruta baga,	133
On the preparation of orchard grass-seed for sowing,	134
Excavating by steam,	134
Care of cows,	135
On the culture of silk in France,	151
Grafting and inoculating,	153
Treatment of cattle,	156
Experiments with various grass-seeds,	158
Breed of swine	159
Weeds as manure, and various remarks,	165
Value of root crops,	166
Inefficacy of oyster-shell lime,	176
Improved breeds of swine,	181
Large oak trees,	184
More about hogs,	185
Irrigation of Lombardy,	192
Monthly commercial report,	
Long preservation of the vitality of silk-worms eggs,	192